

COAL AGE

A MCGRAW-HILL PUBLICATION

MARCH, 1958

Selling Your Company
And Your Industry . . . p 74

Test Your Tax I-Q p 137

PRICE \$1



Eight-Step Contour Stripping . . . p 90



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Photo courtesy Left Fork Fuel Co., Quinwood, W. Va.

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B.F. Goodrich improvements in rubber brought extra savings

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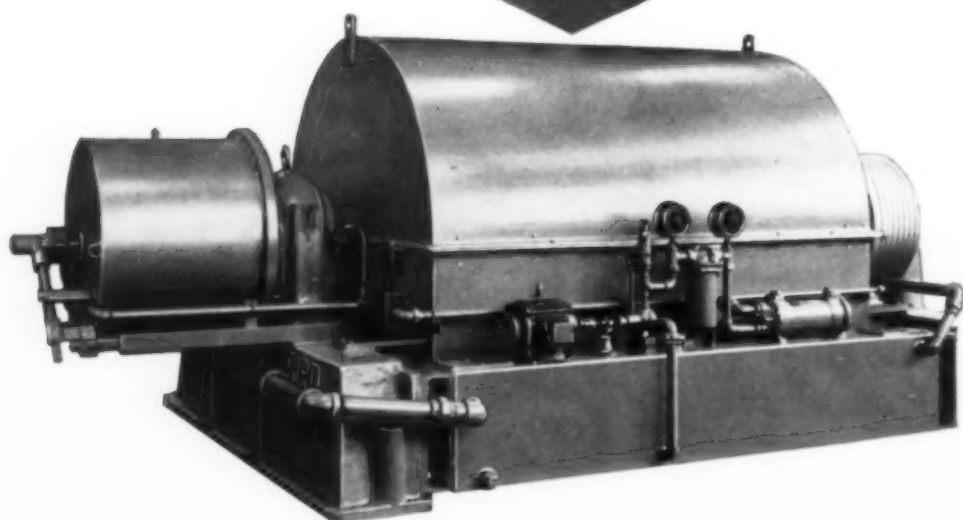
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This Month in

MARCH 1958

COAL AGE

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Public Relations

Selling Your Company . . . And Your Industry p 74

W. A. Raleigh Jr., Assistant Editor, *Coal Age*

A panel of 14 industry authorities, who are doing outstanding jobs in the specialized field of public relations, find the industry's prestige at or near a new high . . . with much yet to be done. Included in this 12-page report are suggestions for getting across the story of coal's achievements and potential to employees and prospective employees, customers and suppliers, investors, legislators, and the community at large.

Features—Plain statements by industry leaders on what is good and what is yet needed, and a series of questions to help you gage your own PR effort.



Stripping

Pettito Bros'. Eight Steps to Contour Mining p 90

Removing overburden, loading coal and augering in two seams, Redstone and Pittsburgh in northern West Virginia, is a productive step-by-step of contour mining by a growing company. Over-and-under auger holes in the Redstone lead to more complete recovery from holes drilled 208 ft long under the final highwall.

Keynote—How purchases of new equipment and company growth go hand in hand.

Coal Preparation

Good Preparation Design p 100

F. R. Zachar, Consulting Engineer, Christopher Coal Co., Osage, W. Va.

Careful consideration of all details in the design stage is vital in arriving at a preparation plant that will do the job today, lend itself to low-cost modification if necessary to meet changed demands in the future, and be economical to operate and maintain. These details include preparation goals, provisions for changes, refuse disposal, plant water, loading facilities, raw-coal storage, washing limits, structural details, equipment details, interchangeability, power supply and painting.

Along the Way—Ten desirable features in a plant layout.

Face Ventilation

Auxiliary Fans at the Face p 106

R. W. Stahl, Mining Health and Safety Engineer, U. S. Bureau of Mines, Pittsburgh, Pa.

Even a good line brattice can lose up to 95% of the intake air in 100 ft. The need for more air at the face in a continuous-mining place demands new approaches to solving the problem of getting it there. One possibility is the use of a combination of blowing and exhaust

(Continued on p 7)

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by smoke . . . by drum . . . by phone . . .

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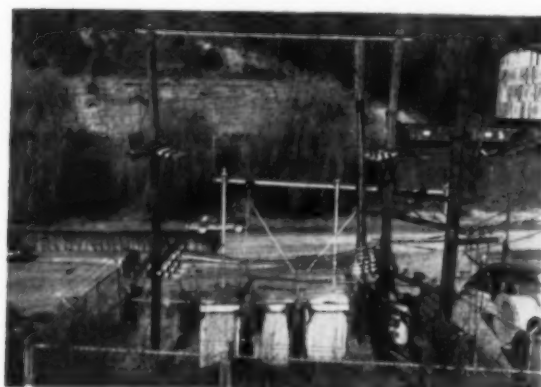
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Bonus—Charts of methane-content levels as they vary with length of drive.



AC Power Distribution

How Princess Elkhorn Distributes AC Power p 116

Proper initial design, high-quality construction and constant system improvement are features of Princess Elkhorn's AC distribution system which serves nine synchronous-converter substations (total: 2,125 kw at 275 V DC) and two preparation plants (total: 825 kva, 7,200/440 V). Lower power costs and improved service are the advantages.

Extra—Property map and overlay showing system layout.

Belt-Conveyor Maintenance

The Beltman's Guide p 122

Sixty-nine recommendations for preventing loss and damage in handling and storing conveyor belting, in installing conveyors and conveyor belting, in protecting belts, and in reducing the possibility of personal injury.

Fifteen common causes of trouble in belt operation and how to correct them.

Thirty-nine common ways belts can be damaged and what to do about them.

Underground Gasification

The British Program p 132

Gasification of coal in place is seen as an attractive possibility for augmenting British energy sources. Pilot installation at Newman Spinney is designed to supply gas to a 5,000-kw power plant and to serve as a basis for designing a 60,000-kw installation 3 to 5 yr hence. Blind borehole technique will be employed, with each

This Month in

SAME PATTERN?—Still slow, with the weekly tonnage running around 8½ million was the bituminous pattern as the industry went into March. The question therefore still remains: "When do we start up?"

If the experts are correct in their belief that this is not the beginning of a real depression but rather a recession (most of them still are holding to that opinion), perhaps the past—particularly the years 1952-54—might provide a clue as to when the upturn might take place. In 1952, bituminous output started sliding off early in January, and after getting down to a weekly rate of a little under 7 million began coming back about the middle of July—a little over 6 mo. In 1953, the slide began about the middle of September and lasted until recovery began early in April—again a period of a little over 6 mo.

If the pattern should repeat, the second quarter should see the upturn start in both business and bituminous production.

WEATHER BREAK?—Compared to bituminous, anthracite has suffered relatively less from the recession and also has benefited to some extent from a break in the weather in recent weeks. More cold than for some time also has prevailed in bituminous market areas, with the result that Appalachian Coals, Inc., noted early in January that it had been sufficient to raise demand for the season as much as 10%. If the fall and winter of 1958-59 should continue the pattern, anthracite should fare fairly well and bituminous should benefit from some real strength in its domestic markets—and perhaps could experience a sizeable increase in domestic demand.

STILL HOLDING—Another major market running countertrend is overseas exports. It started out in January exceeding the previous January by 7%, and has continued to do quite well, with help from a break in the weather in Europe, plus the fact that the U. S. recession has not spread across the water. At least it hasn't so far, and unless the slide continues here it probably won't. Low charter rates—down to under \$4 for the Hampton Roads-Rotterdam route in January and February—are another powerful incentive to foreign purchasers to do business now. In fact, both here and in Europe, some informed observers and analysts feel that overseas shipment from the U. S. in 1958 could top the 1957 record.

IN CONGRESS—Taxes, oil imports, natural gas and research are again in the spotlight in the present session of Congress, along with freight rates before the ICC. Chances may be improving for favorable action on some Congressional items, but are not listed as too-favorable in avoiding the coal increases included in the latest railroad request. Depletion rates, for example, are long overdue for an overhaul and this may be the time. And noncoal interests backing the natural-gas bill are so anxious for help in getting it passed that they have been willing to meet coal at least partway. In oil, if voluntary restrictions work, there probably will be no action on imports, while a boost from the administration could get coal-research support under way.

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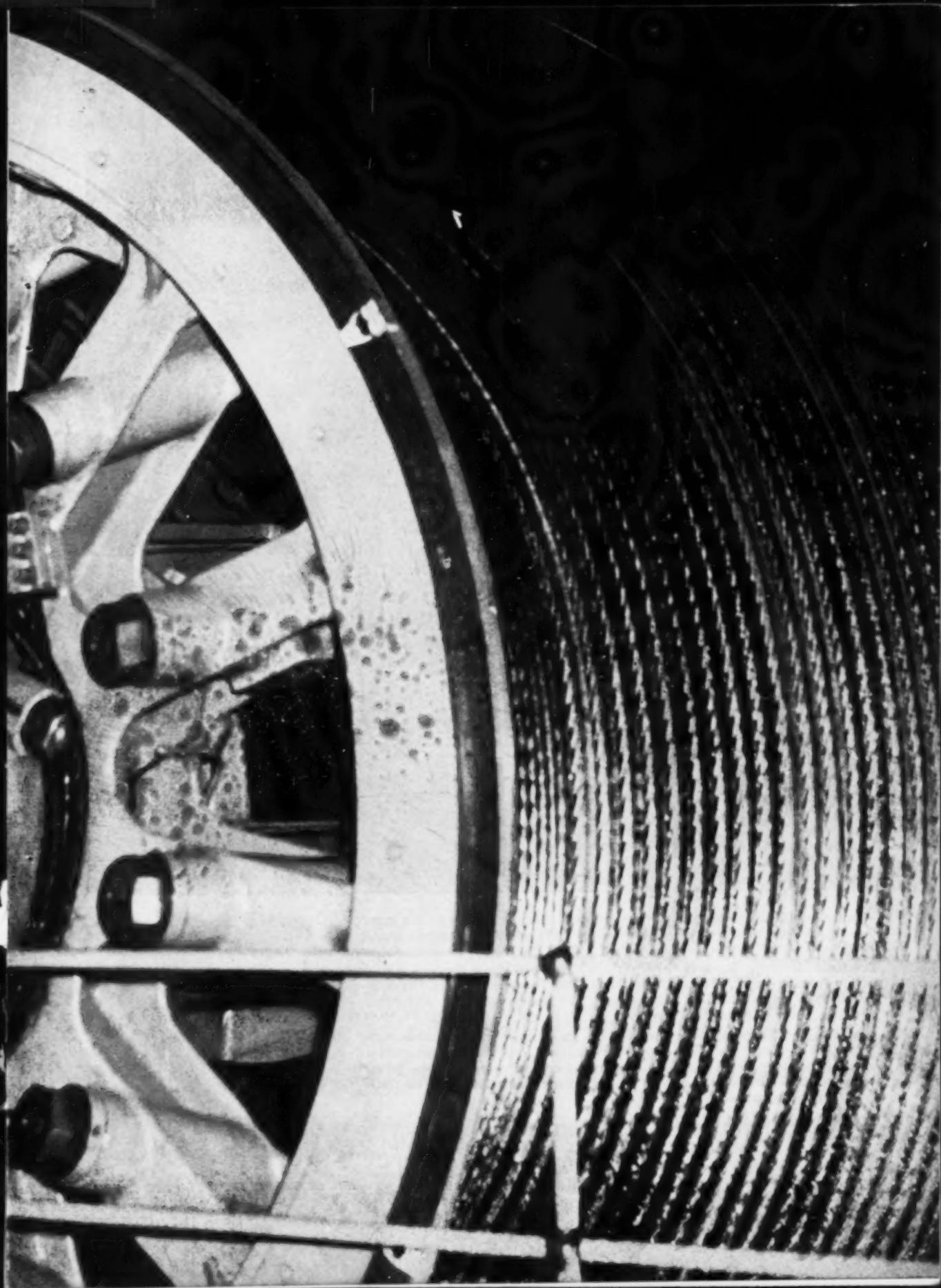
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BETTER RUBBER FROM START TO FINISH

March, 1958 • COAL AGE

This Month in Coal Age—Cont'd

section, reached by a shaft and 300-ft-long gallery, comprising 10 holes 330 ft deep on each side. The gas has a heat content of 70 to 100 Btu, using air, and calculations indicate a saving in costs of Btu's with gas at the mine head compared to coal at distant plants.

Sidelights—How burning takes place in a blind borehole. How ignition is accomplished, air is supplied and gas is taken off.

► Income Taxes

Test Your Tax I. Q. p 137

Fourteen examples of common income-tax questions and the answers thereto prepared by the American Institute of Certified Public Accountants in cooperation with the Internal Revenue Service. Range is from reporting the cost of a new roof for the office building to Thursday-night poker losses.

Question—Can fees to CPA's for preparing returns be deducted?

Answer—Yes, in full.

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COAL AGE • March, 1958

This Month in Mining Practice

PREPARATION TRENDS—Cleaning in heavy-medium baths continued its upward trend in 1957, as might be expected. Along with this rise, the double-deck washing table made major headway for the finer sizes. The fine-coal jig also came into the picture in increasing numbers along with added froth-flotation installations. The typical fine-coal-and-water circuit became more and more one of centrifugal dryers, cyclones, filters and thickeners, with thermal drying holding its accustomed place. Developments in raw-coal storage installations included closer study of type and capacity to attain most economical results. And new types of dust-allaying and collecting equipment were tried in a growing trend toward cleaner plants and surroundings.

Ahead for 1958: More emphasis on these items, and on certain others, including refuse-washing.

AC MINING—News of new AC coal mines about to go into production are further evidence that the trend to this type of power is running stronger and stronger. It was, of course, made possible by the AC shuttle car, which has now been in service long enough and in sufficient numbers to show that it can hold its own as a member of the mining team. Even where DC still is necessary for a mainline rail haul, AC is being more and more specified for all other mining operations.

Conclusion? The small handful of mines now using AC at the face is destined to become a big group in the next few years.

DRILLING IN SHAFT-SINKING—The drilled shaft for ventilation openings away from the portal, for handling men and materials, and for emergency escape is definitely a low-cost type of opening. Its size, however, is relatively limited with the result that until a few years ago larger shafts had to be sunk by conventional methods. This still is necessary with the deeper openings, though the mucking process is speeded up by electrically-powered tractor shovels and other special devices. Shallow openings, however, can be outlined by drilling with vertical-type equipment for a major saving in sinking cost. Now, revisions in drilling equipment which limit the wandering of bits make it easy to outline up to 150 ft or more.

SIMPLE BUT EFFECTIVE—Rope clamping methods might be thought of as something where little improvement is possible, or if so the results would be difficult to discern. Not necessarily, however. An improved clamping system developed by one major stripping company for its dipper hoist lines permits raising the dipper sufficiently for spoiling 5 ft higher. Though this in turn required lengthening the stick 5 ft the return for a relatively small expenditure is sizeable.

And in Addition—Strand instead of wire rope for the boom supports saves too.

ELECTRONICS UNDERGROUND—The radio in its various forms has become a widely used and reliable form of underground communication. Now, the transistor telephone has come in offering advantages of lightness, reliability and lower maintenance.

The Coal Commentator

It Does

Can public-relations programs get results? This question becomes particularly appropriate in view of the special report on this particular activity in the feature section of this issue. The answer is that it has in at least one specific instance—an announcement from Ridge Manor, Dade City, Fla.

Your commentator was intrigued and the efforts of Ridge Manor have resulted in a little publicity—on this page at least. The reason becomes apparent when it is noted that the announcement reports that Mr. and Mrs. Clyde F. Wilcox—he is chief electrician for Federal No. 1 mine, Eastern Gas & Fuel Associates, Grant Town, W. Va.—have bought a site for their future home in Ridge Manor.

So, with all good wishes for a long and happy life in Florida for Mr. and Mrs. Wilcox, your commentator would like to make the point that public relations, meaning, among other things, the right kind of publicity, does pay off.

Gyro Haulage?

Whether the haulage workhorses of the present day—the electric locomotive and the belt—will ever be seriously challenged still is a question that cannot be answered until the ban against the diesel is lifted. It is the most promising of the newcomers, but there are others, including pumping coal in air or water. The electrogyro locomotive is one of the latest additions to the list.

Now being tested on the surface by the National Coal Board of Great Britain, and cited as having potential application underground, the electrogyro locomotive embodies flywheel equipment and a motor that serves (a) to wind up the flywheels and (b) as a generator supplying traction motors, during which part of the cycle it is driven by the flywheels. Wind-up time is about 2½ min, after which, it is reported, the locomotive can run up to 30 min.

Could be that such equipment, with improvements and modifications, might carve out a place in coal mining.

One Need Today

Among those who deplore the tendency in certain circles in the U.S. to do nothing without first checking on the Russian line is your commentator. At times it seems that the U.S. feels it must rush out and buy up all the antibiotics available every time a Russian sneezes. However, subscribing to this

viewpoint does not rule out noting that Russia is now almost the world's biggest coal producer—if it has not already reached that status. It did it by turning out a total of over 500 million tons in 1957—at least according to Soviet figures.

Reason? Coal is one of the most-plentiful and lowest-cost sources of energy available to the Russians.

Moral for the U.S.? A renewed appreciation of the inherent values represented by the country's coal resources and producing facilities.

Man of Coal

Look down the list of the companies which produce the majority of the bituminous tonnage today—the group that might be termed the backbone of the industry. It quickly becomes apparent that the big majority have histories going back many, many years.

One reason for this longevity in an industry which has not been the easiest to stay afloat in, let alone prosper, has been management and managers. An outstanding example is the Island Creek Coal Co. and James D. Francis, whose career in the coal industry ended with his passing Jan. He brought Island Creek through one of the most difficult periods in coal's history to a position even better than before, and in addition was the guiding spirit in the development of its present management men and policies, with the result that the company is continuing on to new highs in output and service.

"Excellent! done" is about the most apt summary of the works of this outstanding man of coal.

Million-Miler

Two pieces of information recently come to the attention of your commentator prompt this little piece. One was a report by a public-opinion polling organization that very few operators of motor vehicles will admit that they might have driving faults. The second, in the *CF&I Blast*, notes that John Pasarelli has driven a truck for the Mining Dept. over one million miles without an accident since March, 1942.

The Pasarelli recipe? "Use your head instead of your foot—the one on the gas pedal. Always give the right-of-way to women. Be willing to concede the right-of-way in place of a life. Take it easy. Always be careful. Know your driving capabilities and rest requirements. Never drive when sleepy."

Right off the

Wire

A new system using multiple cathodes is said to double the life of the vapor lamps used on highways.

A thermionic converter has been made that produces electricity directly from heat with an efficiency of eight per cent.

Studies of the northern lights being made with a high-powered, long-range radar may disclose a method of defense against missiles coming over the arctic.

Submarine cable can be made in any length at the Simplex Submarine Cable Division's dock-side plant. Single lengths are limited only by the capacity of a cable ship's hold, or the length of a train of gondola cars.

An electronic system of bank record keeping handles randomized, unpunched paper checks at the rate of 1800 checks per hour to 40,000 accounts.

The world's largest solar furnace is being designed for installation in New Mexico. It will produce temperatures as high as 8,000°F.

Elimination of thermal noise by operating microwave amplifiers at the temperature of liquid helium has been found to greatly increase the range of radar.

An electronic map plotter is expected to make possible more accurate and cheaper maps from aerial photographs and to lend itself to the automation of mapping.

Plans are being made to mount telescopes on balloons in order to make observations above the interference of the earth's atmosphere.

The U. S. Air Force has patented an infrared television camera for use at night or in fog.

A new chemical plant will need no outside source of fuel after operation has begun. All the heat required will come from the process.

It has been found that one area of the human brain contains a record of every detail of the person's experience. Total recall can be produced by the stimulation of a minute electrical pulse.

Phosphors applied to textiles, sheet materials or metal mesh light up when a current is passed through them thus making draperies, for example, sources of illumination.

A new microscope for the study of living tissues uses bursts of ultraviolet light too brief (one thousandth of a second) to injure the tissue. The image appears in color on a television screen.

A new drug promises to save the lives of many persons who might otherwise die from lethal doses of radiation. It has been tried only on laboratory animals.

A form of fiber glass containing uranium 235 has been developed as a fuel for atomic furnaces.

A new amplifier is expected to extend the range of radio telescopes about ten times, enough to equal the best optical instruments.

A giant air mattress, equipped with arresting and launching gear, has been patented for use as a portable airstrip. On it planes could make belly landings without damage.

Tellurium lead cable sheath has excellent vibration, creep and age-hardening resistance, and greater flex life and tensile strength than other lead alloys, say Simplex scientists after exhaustive tests.

A new meter for oil pipelines will measure a flow of 10,000 barrels per hour (four times the capacity of present equipment) with an accuracy of one tenth of one per cent.

Simplex C-L-X (Sealex) metallic sheath is manufactured with thermoplastic covering in colors for voltage or general industrial coding.

A device called an "electronic sentry" guards against fire, abnormal pressure, high or low water levels, temperature changes and other hazards. It calls a designated person by telephone and gives a pre-recorded message.



"Tree" of Knowledge

This strange looking growth tells an important story to the expert eyes of Simplex scientists. It's a Simplex photomicrograph showing "treeing" effect that results when a 15 KV polyethylene-insulated cable is broken down by 100,000 volts. This is typical of the continuing research work done at Simplex.

If you are interested in the important facts that Simplex scientists Kitchin and Pratt have discovered on polyethylene treeing, write for their AIEE Paper No. 58-121.

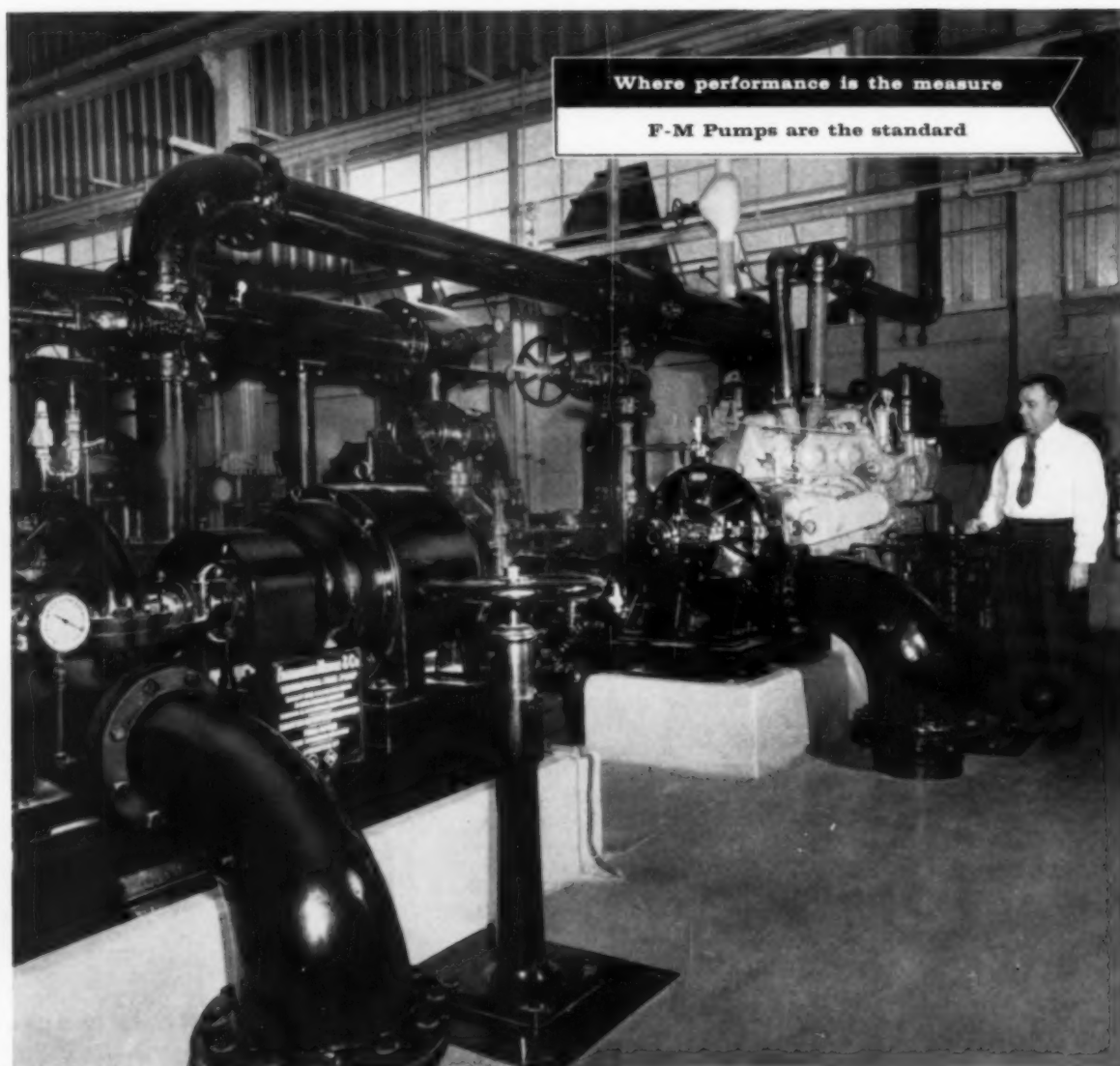
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Signalling

"The American manufacturers of transoceanic telephone cables"



Mr. George Biggar, plant engineer of Ford Motor Company assembly plant at Mahwah, N. J., checks Fairbanks-Morse fire pumps (1500 gpm. motor-driven pump in foreground, 2500 gpm. diesel-driven pump near Mr. Biggar).

Ford guards against fire at giant new plant

To protect one of the world's largest auto assembly plants against fire, Ford Motor Company depends on these two Fairbanks-Morse fire pumps. As the heart of an extensive system, the two F-M pumps provide defense in depth, one pump backstopping the other.

This installation is typical of the great care and planning by modern

industry to prevent the catastrophe of fire. Call in your F-M Sales Engineer for expert assistance in pump specification. As builder of the world's greatest variety of hydraulic combinations, Fairbanks-Morse will provide the exact type, exact size

pump you need for maximum dependability.

For information write Fairbanks, Morse & Co., Dept. CA-3, 600 S. Michigan Ave., Chicago 5, Ill. Ask for F-M Fire Pump Bulletins 5814F (horizontal) and 6920F (vertical).



FAIRBANKS-MORSE

a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS



Through rock, bone, slate, sulfur . . .

In less than a minute, Kennametal Rotary Drill Bits complete seven-foot holes in this tough anthracite seam near Wilkes-Barre, Pennsylvania.

KENNAMETAL* Rotary Drill Bits are the answer to tough anthracite drilling problems

Since the mine's beginning in August, 1956, drilling conditions have been exceptionally tough at Slope 131 of Hanover Coal Company's Sugar Notch Colliery. This virgin basin of the Number Three Seam ranges from 36 to 72 inches, with lenses of bone, slate and pyrite. In such conditions, drilling never gets "easy," but Kennametal RD 1½ and DL 1¼ Bits have provided the best answers yet.

As soon as they begin to get dull, signalled by the additional push required on the drill, bits are removed and resharpened. Regrinding time is very short, drilling is faster, easier, and carbide loss is kept to a minimum. Morgan Bird, General Manager, and Superintendent Robert Russavage report that bits average 40 regrinds, for a productive life of 4000 to 4500 feet. Drillers stress the very evident lessening of dust and noise when using the Kennametal Rotary Bits.

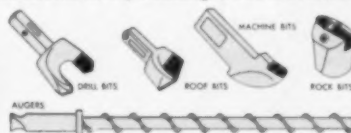
Near Nanticoke, Pennsylvania, in this same anthracite area, Kingston Excavating Company opened a new slope mine in December, 1956. Ranging from 7 to 12 feet, the Number Five Vein is on a pitch up to 60°, and contains partings of bone and rock, with streaks of sulfur. General Manager Herb Traher describes conditions as the "toughest drilling I have encountered in the Northern Anthracite Field." Kennametal Rotary Bits have again provided the best answer. Using RD 1½ Bits and Kennametal A13-8 Augers, a face can be drilled in less than an hour, using only one bit. Bits average 35 to 40 regrinds, or 2800 to 3500 feet.

Let your Kennametal Representative help you select and actually test Kennametal Bits in your mine. You'll find his name listed in the Classified Section of your Telephone Directory under "Mining," or write KENNAMETAL INC., Mining Tool Division, Bedford, Pa.

*Trademark



INDUSTRY AND
KENNAMETAL
...Partners in Progress



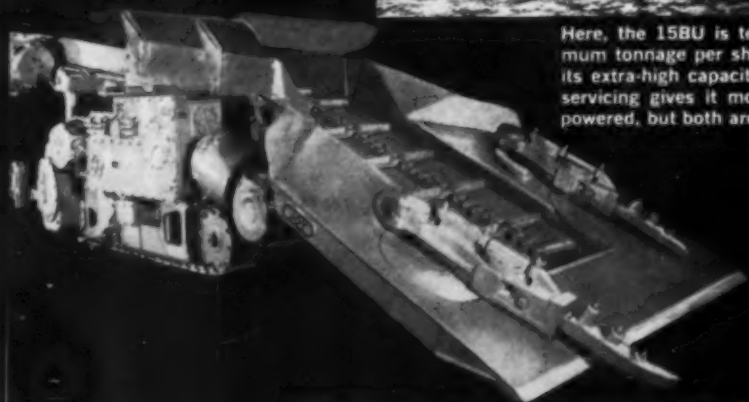
3119



"Crowding-in" with the 15BU-1B. This model is 49½" high. A lower model is 43" high . . . can work in 50" coal. Notice how motors, transfer cases, controls and drives are mounted on the outside of the loader for easy inspection and maintenance.



Here, the 15BU is teamed with the high-capacity 15SC shuttle car for maximum tonnage per shift. This new loader reduces cost-per-ton two ways. First; its extra-high capacity loads more tons per shift, and second; its fast, simple servicing gives it more operating time at the face. Machines shown are DC powered, but both are available in AC or DC.



new JOY 15BU LOADS 15 TONS PER MINUTE
HAS "swing-out" SERVICE PANELS

The 15BU, like all Joy machines, is available in AC or DC.

Swing-out control panel
Traction motor and gear cases
Inverted conveyor jacks
Hydraulic couplings
Rear of gear cases
Hydraulic pump, motor and tank

REAL ACCESSIBILITY TO ALL OPERATING AND CONTROL MECHANISMS... A JOY FIRST!

For the first time, all sections requiring regular inspection, servicing or maintenance can be reached from the outside. The hydraulic pump, motor and oil tank are mounted on the swing-out bumper. The electrical control panels swing open with all controls mounted on the inside of the hinged cover plate. And, all motors and drives are mounted outside the frame.

This easy, fast servicing, together with quick, responsive, high-tonnage operation, gives you the chance to make a substantial reduction in costs-per-ton... the savings you need to maintain or increase your profit margin today.

The 15BU is just one of many new machines designed by Joy for faster, more efficient mining... the result of a continuing program of research and development. Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

WRITE FOR BULLETIN 233-1

JOY EQUIPMENT FOR MINING... FOR ALL INDUSTRY



CONTINUOUS MINERS, MOBILE LOADERS, SHUTTLE CARS, COAL CUTTERS, CUTTING MACHINE TRUCKS, COAL DRILLS, CONVEYORS, TIMBER SETTERS, SHUTTLE CAR ELEVATORS, BELT FEEDERS, FANS, BITS, PORTABLE BLOWERS, COMPRESSORS, ROCK DRILLS, HOISTS, CORE DRILLS

WSW CL7049-888

REPORT FROM CATERPILLAR ON BIG HORN MINE:

Eleven big, yellow machines help



Balanced design and dependable four-cycle Cat Engine of No. 12 Motor Grader mean round-the-clock production, minimum down time. Operators like fast, positive controls, easy blading positions, unobstructed visibility.



mine 370,000 tons of coal a year



▲ Hauling big loads fast is characteristic of DW21-No. 470 combinations. Turbocharged engine means efficient horsepower; LOWBOWL design provides less loading resistance and faster loading cycle. Capacity: 18 cu. yd. struck, 25 cu. yd. heaped.

At Big Horn Coal Company's mine near Sheridan, Wyo., 370,000 tons of coal are being stripped a year by a team of Caterpillar earthmoving equipment: five wheel-type CAT DW21 Tractors with No. 470 LOWBOWL Scrapers, two No. 12 Motor Graders, one D9 and three D8 track-type Tractors.

Opening a new pit recently, this team worked in sub-zero weather, fighting the poor footing of a river bottom. A 20-foot layer of sand and river gravel was removed—some 500,000 cubic yards. "We found the big tires on the scrapers and the greater flotation of the D9," says Mine Superintendent Cliff Artis, "helped us strip under adverse conditions."

Peter Kiewit Sons' Company, a construction firm of which Big Horn Coal Company is a subsidiary, operates the Caterpillar equipment on road and other construction jobs during the summer. This is real *versatility*, a hallmark of every Caterpillar product. It means more real value for every equipment dollar because Caterpillar machines do many jobs well.

For profitable production, you can't beat the combination of good machines and good dealer service. You get *both* from Caterpillar. Ask your Caterpillar Dealer today for an *on-your-job* demonstration.

Caterpillar Tractor Co., Peoria, Ill., U.S.A.

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



Ever see tougher operating conditions?

*Tiger Brand Amerclad
is made for this treatment*

ON THE TRACK-TAMPING MACHINE shown here, the cable is flexed 4,500 times per minute. Eight powerful vibratory motors are used to drive eight tamping assemblies. Each motor is powered with Tiger Brand Amerclad cable.

It wasn't always that way. Other cable did a good job—for a while. But the shattering vibration actually caused the jackets to peel away from the conductors. Then Amerclad, with its dynamically balanced conductors and tough, lead-cured jackets, solved the problem. In fact, the manufacturer says, "Tiger Brand is superior to anything we have ever seen for this type of service. It is completely dependable under all conditions."

For an interesting contrast, look at the power shovel pictures, and the three-inch diameter Amerclad. It's the same kind

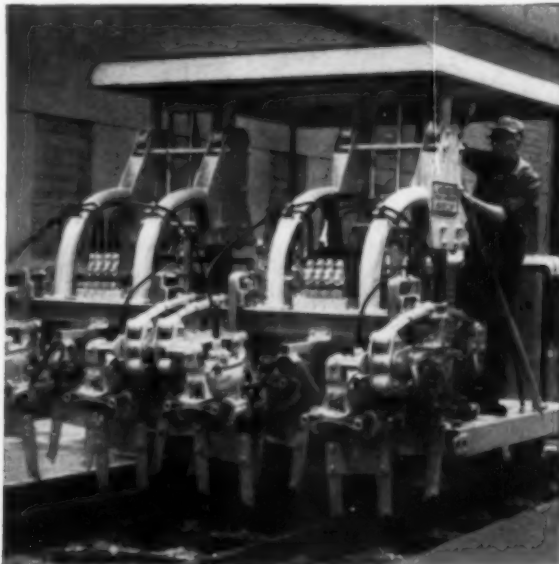
of cable used on the track tamper, only bigger and with more conductors. Operating conditions are different, though. Some of the cable is right in the blast area where it is dragged over sharp rocks and pounded by dynamite-propelled boulders. The cable operates 24 hours a day at temperatures that range from 100° in the shade to minus 40° in shoulder-deep snow.

When you specify Tiger Brand Amerclad, this is the quality you get. We make no second- or third-grade line. All Amerclad is made to the same exacting specifications—designed for users who demand the very best because they can't afford expensive down time. Why not call your American Steel & Wire salesman and ask for more information about this quality cable?

American Steel & Wire Division, United States Steel, General Offices: Cleveland, Ohio
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York



Notice the long span of the cable bridge and the extreme flexibility of the Amerclad in the foreground. It's the same cable.



Railroad track tamper is a completely self-contained unit. Notice the eight cables which feed separate vibratory motors.





This is a typical power shovel at the mine. The Amerclad runs along the ties and under the tracks.



USS TIGER BRAND ELECTRICAL WIRE & CABLE

a standard Tiger Brand cable for every special job

- Asbestos Wire and Cable
- Mold Cured Portable Cord
- Shovel & Dredge Cable
- Paper & Lead Cable
- Varnished Cambric Cable
- Interlocked Armor Cable
- Special Purpose Wire & Cable
- Aerial, Underground and Submarine Cable

UNITED STATES STEEL



New from tip to shank!

"FREE FLOW" DESIGN MAKES NEW

"Free flow" design — increased throat area (shaded area) allows cuttings to flow through freely for faster drilling, lower power consumption, reduced tip breakage.



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CARBOLOY® PTV BIT 3 WAYS BETTER!

1 "FREE FLOW" design means faster, easier drilling

Larger throat area allows cuttings to flow through freely — reduces packing and stalling. Result: faster penetration, cooler cutting. Modern heat-treating permits use of less bulk steel without sacrifice in strength.

2 "FREE FLOW" design means more economical operation

Bit is easier to recondition, because there is less steel to grind. Power consumption is reduced by freer cutting action. Machine downtime is cut because bits drill longer, more continuously. Also, with a PTV you get almost 100% use of carbide—less wasted carbide after normal life.

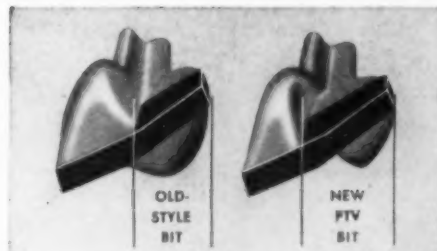
3 "FREE FLOW" design means longer bit life

Less packing and stalling minimize chance of tip breakage — while heat-treating makes the new PTV just as rugged as old-style conventional bits. And in a Carboloy carbide tip, you have the most wear-resistant carbide used in any standard roof bit!

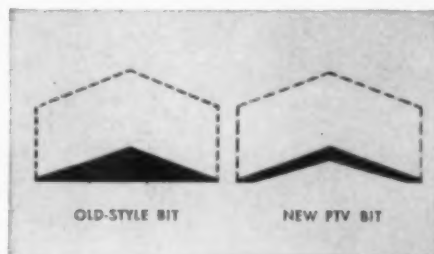
This new PTV bit is now available from your Authorized Carboloy Mining Tool Distributor. Call him today (his name is listed below), or write: *Metallurgical Products Department of General Electric Company, 11120 E. 8 Mile Road, Detroit 32, Michigan.*

CARBOLOY®
CEMENTED CARBIDES

GENERAL  ELECTRIC



Old-style bit (left) has more bulk steel on prongs — is more likely to pack and stall. Streamlined PTV (right), with its open-throat design, allows freer flow for faster drilling.



Old-style bit (left) leaves wasted triangular section of carbide (shaded section) after normal life. New PTV (right) gives almost 100% utilization of carbide by eliminating unusable section.



Here's the most wear-resistant carbide on any standard roof bit. Lets the PTV drill longer, more continuously. Economical, too, because it permits many more regrinds.

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Marathon Coal Bit Co., Inc.
RAVENSWOOD
Fairmont Supply Company
SHINNSTON
Erwin Supply Co., Inc.

KOEHRING WORK CAPACITY *in action...*



A new 2-yard — Latest addition to the big Koehring line of excavators for mining and quarrying is this new 805. It's a heavy-duty 2-yard machine, with 25-foot deep-section shovel boom, and 18½-foot dual dipper sticks. You'll like the 805's power, strength, stability in heavy digging — and *extra capacity* as a dragline or crane for stripping, stockpiling, lifting. It handles 2 to 3-yard dragline bucket — lifts up to 52 tons.

"Diving" for gravel — Loading out of a water-filled gravel pit (right), this 405 dragline puts production on a big-tonnage basis. It has plenty of work-radius for this type of operation — can be used with 40 to 90 feet of boom, and handles 1 to 1½ cu. yd. bucket depending on weight of materials. Check its other work capacities on opposite page, then let your Koehring distributor show you what the 405 will do for you.

Re-working a slag bank — Once cast aside as waste, slag is now being reclaimed from this bank, run through a crusher, and used as sub-base material on road construction. During the process, slag is swept by a magnet to remove any scrap metal. Here, a Koehring 1½-yard 605 shovel loads the slag into Dumpsters for haul to crushing plant. This combination of Koehring shovels and Dumpsters makes a heavy-duty, high-production team. 6-yard Dumpster® climbs 24% grades fully loaded, dumps in one second, travels at same high speeds in either direction — no need to turn.



Mining copper ore — At this open-pit mine in the Southwest, overburden has been stripped down to pay-dirt. Next, a Koehring ½-yard 205 loads out copper-bearing ore for haul to smelter. Powerful crowd, fast retract, smooth swing, and instant dipper-trip speed production in the pit, keep trucks on the run.



Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES	
		(Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
205 CRAWLER	½-Yd.	20,000 lbs.	at 10-ft. radius
205 ON RUBBER	½-Yd.	30,000 lbs.	at 12-ft. radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-ft. radius
305 ON RUBBER	¾-Yd.	50,000 lbs.	at 10-ft. radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-ft. radius
445 ON RUBBER	(Crane only)	90,000 lbs.	at 15 ft. radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-ft. radius
805 CRAWLER	2-Yds.	104,200 lbs.	at 12-ft. radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 12-ft. radius

Want more information?

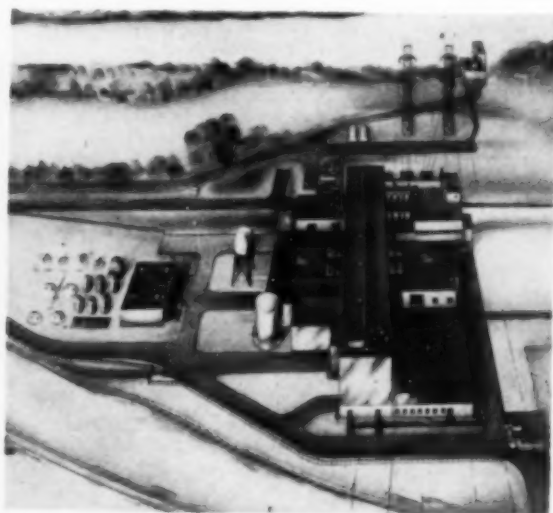


See Koehring distributor.

KOEHRING DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wis.

K782

News Roundup



NUCLEAR PLANT (above) at Shippingport, Pa., is operating 24 hr a day producing about 68,000 kw. Reactor core (left) is lowered into pit. Plants like this one are in formative stages around the world. Opponents of atomic energy point out that operating costs at Shippingport are thirteen times greater than if conventional fuels were used. Atomic Energy Commission says the plant is a justified experiment.

Atom Chiefs Set Their Sights

The Atomic Energy Commission has announced its plans and there's plenty of wondering in fuel circles.

The AEC and the Joint Congressional Committee on Atomic Energy have informally agreed on a target date of 1968 for attainment of economic nuclear power in the United States. They also announced that there would be increased assistance for the building of atomic power reactors at home and abroad.

The main aims of the AEC are these. They want to:

1. Get nuclear power on a competitive basis as soon as possible. This, says the AEC, is a long range goal and should take about 10 yr.

2. Help our foreign friends as much as they can. Recently, a loan to Greece of \$350,000 was given to finance construction of a reactor near Athens. Development of atomic energy in Europe for competition with conventional fuels should take less than 10 yr, states the AEC, because fuel prices overseas are higher than in the United States. The goal set is about five years.

3. Make it plain to the nations of the world that we are the leaders in atomic energy for peaceful purposes. To do this, it is said, requires continuous aid to foreign nations and a free exchange of ideas. The AEC says this program will go on indefinitely, and the commission hopes for speedy results.

4. Obtain more government aid for building reactors in this country and abroad so as to increase production capacity for the free world.

Plan first—This is all well and good, but some sources say that more planning

is required first before extensive funds are sunk into atomic development. A major part of the coal industry and its supporters has called upon the government to consider arguments against further subsidies of civilian atomic power projects. The Southern Coal Producers Association has declared that there is no evidence that atomic power is cheaper or more efficient than conventional fuels. It is known that the government has already spent \$387,000,000 trying to speed civilian growth of atomic projects. This is termed wasteful by one officer of the coal association.

Many arguments—These are some good arguments given, that should be weighed, against government aid to these atomic projects:

1. It is true that we should be a leader in using atomic energy for peaceful purposes, but there has been no proof offered that private industry cannot develop reactors and atomic equipment quickly and efficiently without huge government expense.

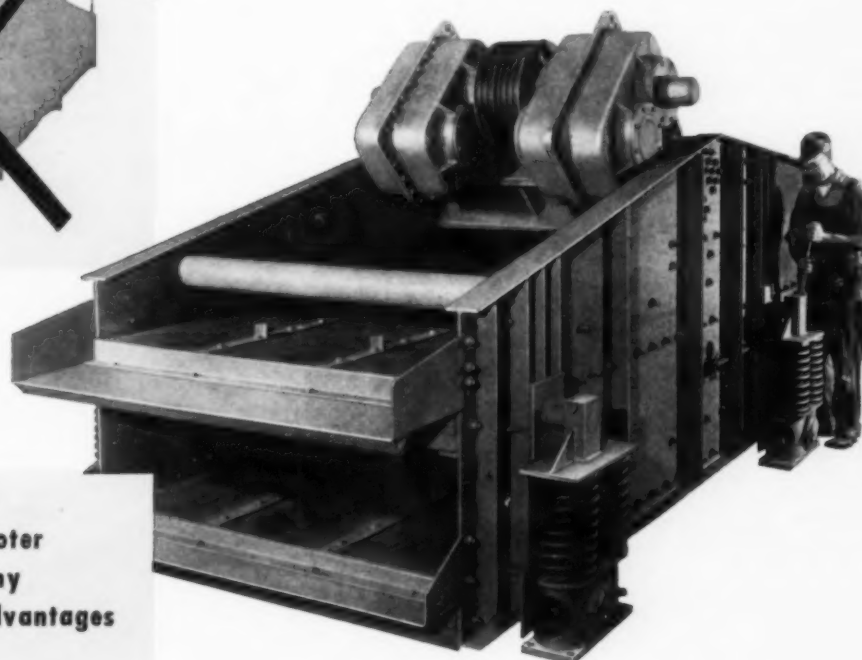
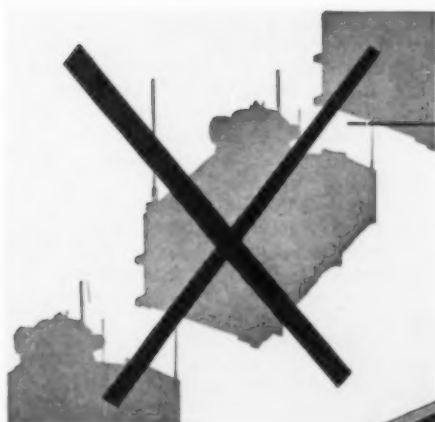
2. There is plenty of conventional fuel left in the United States, and though it is fine to be a pioneer, there seems to be little need for hurry-up, wasteful, spending just to prove a point. We are getting a reputation for that sort of thing. A short time ago it was revealed

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NOW

one BIG SCREEN does the work of multiple units



**Husky 20-footer
offers many
profit-building advantages**

Volume — This single, high tonnage *Low-Head* vibrating screen is a unit that out-produces a series of two or more screens in coal, metal mining and rock products fields.

Multiple operations on one screen — Operations in sequence, such as draining, washing and dewatering, are accomplished on one big Allis-Chalmers screen.

Cut Cost... Save Space

Obviously, in the application of a single unit,

installation cost is considerably less than that of multiple units. Feeding arrangements are simpler. Collecting hoppers and chutes are easier to install. Maintenance costs are proportionately lower. And, of course, a single big unit takes up less space than a multiple unit installation.

For complete information, see your Allis-Chalmers representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 07M7500-111.

Low-Head is an Allis-Chalmers trademark.

ALLIS-CHALMERS



A-3485

News Roundup

that the United States spent millions of dollars in working out ideas which were sitting in Russian research books on a dusty shelf in Washington. It seems nobody had bothered to translate them. The European nations, notoriously thrifty, might have more respect for the country that produces at low cost than the wasteful spender. There were plenty of red faces in the Pentagon when it was discovered that Britain turned out a thermodynamic reactor, "Zeta," for \$840,000 as compared to millions for a similar American experiment.

The future—In short, opponents of atomic power say, **newer** is not necessarily **better**. Coal seems to have done pretty well in the past and promises to hold the fort for many a year to come, say others. Some opposition to AEC subsidies have laughingly declared that if coal were discovered today the government would be chucking out the atom and laying cash into coal subsidies. One can only sit back and wonder.

Gas Hearings End

No findings expected till mid-summer . . . some say Federal Power Commission may wiggle out of any decision.

The Canadian natural gas hearings are over. The arguments over Midwestern Gas Transmission Co.'s right to run a pipeline from Canada to Tennessee bubbled till the very end. Unofficially, the hearings make up the second-longest case in FPC history. The longest was the Pacific Northwest battle a couple of years back, which also featured the Canadian gas issue.

Snake dance—One guess rates as well as any other if you are looking ahead to an FPC wrap-up of the most recent hearing. The case is up in the air. Perhaps the commission will dish out a finding by summer time. But word has it that FPC members would jump at the chance to do a snake dance and wiggle out of a fixed decision.

Getting in licks—Coal men were prevented from answering gas's defense testimony, for coal was not really a party to the case, but only an intervenor. The coal representatives were allowed to cross-examine some witnesses, and this questioning brought out some vital points. Some witnesses admitted that Midwestern would not be able to sell as much boiler fuel as the company had indicated. Most utility plants in the Chicago, northern Illinois and northern Indiana area expect to fire with coal, it was brought out. A lot of industries in the mid-west area are turning-down chances

to use gas because they believe it has about priced itself from the competitive market. So coal got in its licks before the hearings ended.

Watchful waiting—Now coal is watching Prime Minister Diefenbaker of Canada. He has said that he may ask for an interim report from the royal fact-finding group seeking to plan an energy policy for Canada. Normally, the committee would not report for two years, but Diefenbaker seems to want a recommendation whether Canada should issue an import license for mid-western gas. Such an interim report could sway an FPC decision, if the Canadian report should come in time. Is Diefenbaker edging toward the side of Mid-Western Gas Transmission Co.? Coal will have to sit back and see.

New Coal-Char Plant

Washington firm pioneers in new market for undersize bituminous coal.

Koal-Krudes, Inc., of Spokane, Wash., is now operating its new \$300,000 coal-char plant at Red Lodge, Mont. The new plant is operating on a round-the-clock basis to process the first orders for Victor Chemical Co. and for American

Smelting & Refining Co. Six carbonization retorts installed at the plant produce char and distillation products from coal through a continuous process instead of conventional batch methods. The carbonization temperatures, which run about 1,200 F, are quite low for a process which emphasizes carbon output.

By-products—Distilled and condensed coal gases will be by-products of the process at the new char plant. Condensed gases will include coal-tar and creosote, which will be sold to wood-preserving firms, chemical companies and refineries. Metal-smelting firms and chemical companies are expected to use most of the char output. Noncondensed coal gas at the plant will go into a two-compartment combustion furnace and will provide the heat needed to process the raw coal. The process being used at Red Lodge is the first of its kind in the United States, Koal-Krudes officials said. It dates back to 1950, when initial research was conducted on the char process by PD&P, Inc., of Lewiston, Idaho, parent firm of Koal-Krudes.

First research—Work was started at Roundup, Mont., and in 1953, a lease was arranged with Montana State College at Bozeman to conduct a research program at MSC's Ryan laboratory, where PD&P built a plant to test the process. The MSC installation, under the direction of Dr. Lloyd Berg, head of the



THIS EARTHMOVING GIANT is said to be the largest automatic dragline bucket ever built. Manufactured by Page Engineering Co., Chicago, the bucket's weight exceeds 67,000 lb and its capacity is over 960 cu ft. Its tremendous size can be seen by comparison with ½-cu yd dragline bucket (lower left). The huge new bucket will be used to uncover a seam of coal 125 ft below ground, according to Page.



A Bucyrus-Erie 200-W swings a 6-yd. bucket on a 125-ft. boom as it strips clay, shale and limestone overburden. Exclusive Bucyrus-Erie walking mechanism permits smooth, fast move-ups, easy maneuvering to most advantageous working position.

A Bucyrus-Erie 7-W strips clay and rock off of hard coal in Pennsylvania. It is equipped with a 180-ft. boom and a 5-yd. bucket. Modern design keeps front-end weight low to handle big buckets on long booms, concentrate more weight inside the bucket as payload.



These mines profited from Bucyrus-Erie Walkers YOURS CAN TOO

The proved ability of Bucyrus-Erie walking draglines to move big yard-ages at consistently low cost has made them preferred for coal stripping operations everywhere. Why not profit from the experience of others? Choose from the world's largest selection of walking draglines. Contact Bucyrus-Erie Company for full information.

132157C



A Familiar Sign at Scenes of Progress

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

A Kentucky mine uses this Bucyrus-Erie 480-W for stripping shale, sandstone and dirt overburden averaging 60 feet in depth. The machine handles a 14-yd. bucket on 160-ft. boom. Month after month dependability and low maintenance help assure high-volume, economical operation.



News Roundup (Continued)

department of chemical engineering at the college, has been in operation for more than three years. Berg also is associated with D. E. Atkinson in Atkinson-Berg Co., which constructed the plant at Red Lodge for Koal-Krudes. The plant was designed to handle an output of up to 100,000 tons of char a year. The six retorts can process 320 tons of coal a day for making char. Coal used at the plant will average less than 1½ in. in diameter, a size that is considered too fine for many industrial purposes.

Like coke—Officials of Koal-Krudes point out that char is similar to coke with the exception that in producing it, lower temperatures are used for a shorter period. They also say that char does not tend to fuse into a large hard mass, but comes out in particles about the same size as charged. Char, they add, is more friable and can be more easily crushed. This is a quality that is considered an advantage in some industries. Koal-Krudes officials contend that sponge iron smelting and the sintering of sulfide ores are two industries which would be well suited to the use of coal char.

Took four years—The company's Red Lodge plant, which was completed in December, 1957, was started in the summer of 1956 after the MSC research program demonstrated the feasibility of the process. The plant is being operated with the assistance of personnel from the Spokane office of H. E. Bovay Jr Consulting Engineers, a firm with headquarters at Houston, Texas. Marion Mingu, of the Bovay staff, is acting as plant superintendent for the Red Lodge plant and is in charge of operations there. Other Bovay staff members connected with the operation are Ed Darlington, assistant plant manager, and William Pauley, manager of Bovay's Spokane office, who is serving as chemical engineering consultant for the plant.

Serves West—Elmo F. Wilcox, Koal-Krudes president, points out that his firm's new char operation will have the advantage of being set up in the West to serve western industry. The continuous thru-put process being used by Koal-Krudes at Red Lodge is attracting the attention of Montana's coal industry officials. The char industry which the Spokane firm is pioneering in the state promises to develop into an important new market for undersize bituminous coal.

Safety Group Meets

Mining men will join for the first time the tenth anniversary President's Conference on Occupational Safety, which meets in Washington, March 25-27. The

theme of the meeting will be "Safety Conserves Manpower . . . Manpower Builds the Future." The meeting will devote full attention to the future. Only a brief look will be taken at the past to review accomplishments and suggestions of previous conferences.

President Eisenhower will welcome nearly 4,000 delegates in Constitution Hall on March 25. Secretary of Labor James P. Mitchell, who is general chairman of the conference, will speak that day, as well as Ralph Cordiner, president—General Electric Co., and Benjamin Fairless, president—Iron & Steel Institute. The second day will be devoted to workshops ranging from consideration of new techniques for discovering human motivation to the effect on our safety procedures of nuclear energy's move from the Government laboratory to the workplace.

The Technical Advisory Committee for the conference includes five persons from various aspects of mining: Harry Candy Jr—National Coal Association; George W. Sall—American Mining Congress; Charles Ferguson—United Mine Workers of America; Harold J. Sloman—Bureau of Mines; and Dr. William P. Yant—Mine Safety Appliances Co.

Coal Conference

The Gordon Research conferences on coal are coming up this summer. The meetings will run from June 9 to August 29 at Colby Junior College, New London, N. H.; New Hampton School, New Hampton, N. H.; and Kimball Union Academy, Meriden, N. H. These conferences were established to spark research in universities, research foundations and industrial laboratories. Lectures, discussion groups and informal get-togethers will fill out the conference period. Some subjects of discussion will be coal tar, coal hydrogenation, coal gasification and paths in coal research.

It is hoped that each conference will extend the frontiers of science by bringing about a free and informal exchange of ideas between persons actively interested in the subjects under discussion. The purpose of the program is not to review the known fields of chemistry but mainly to bring experts up to date as to the latest developments, analyze the significance of these developments, and to provoke suggestions as to underlying theories and methods of approach for making new progress.

If you wish to attend one of the conferences send your application to George Parks—Director, Dept. of Chemistry University of Rhode Island, Kingston, R. I. State your work and the company

or institute you are associated with, as well as what subject you are most interested in.

West Virginia Mining Code Passes Senate

A broad revision of West Virginia's coal mining laws has skimmed through the state senate and awaits the governor's approval. The house had adopted some sweeping amendments to the measure, but it cleared the senate without change. Some small operators, fearing that the board arranged under the new law would be dominated by big firms, had expressed opposition to the measure. But only Sen. Reed Preston (R) voted against it. The 132-p bill will most likely become law because the measure was included in the agenda which Gov. Underwood gave the Legislature for its 30-day session.

Coal Pipelines Predicted

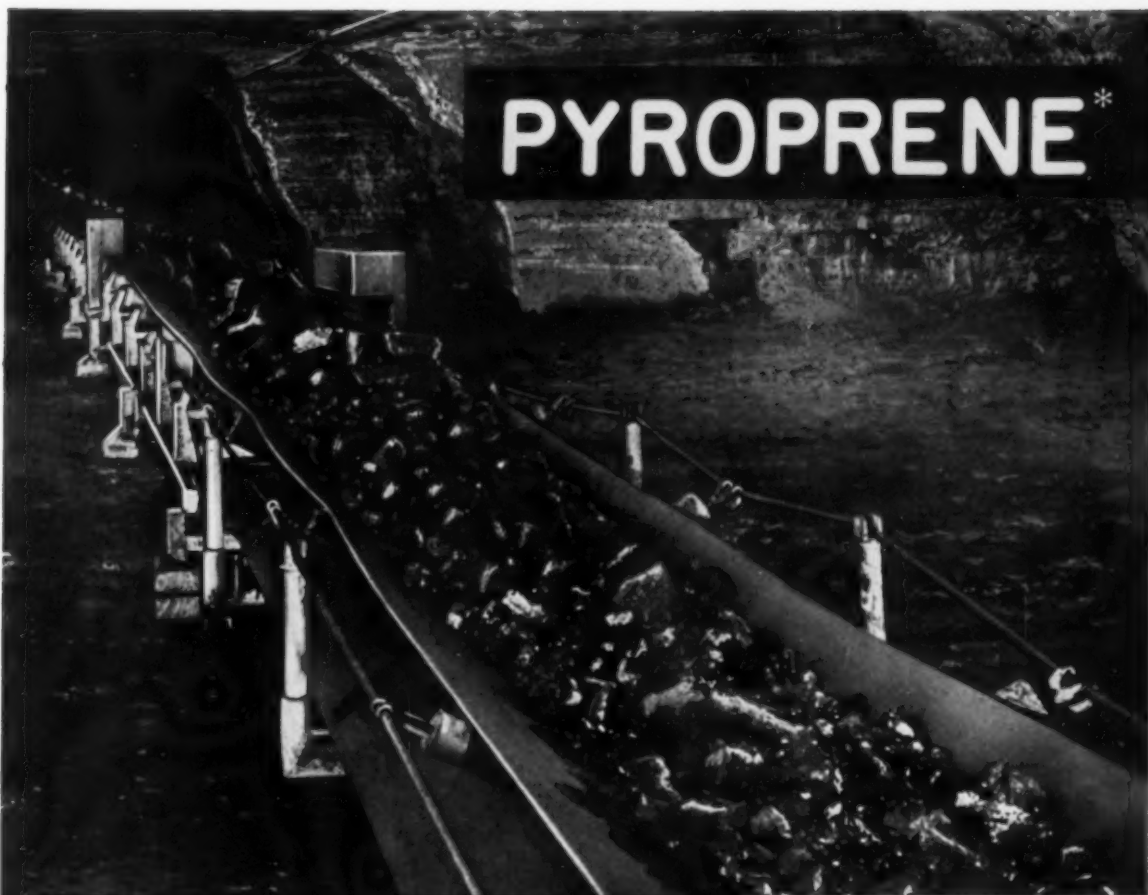
Movement of coal through pipelines was foreseen recently by Sen. Harry C. Stuart of Russell County, Va. He said the idea was being explored. The Virginia Senate recently passed a bill introduced by Stuart and two other senators, giving any pipeline company created to move coal, the right of eminent domain and placing it under control of the state Corporation Commission. Sen. Stuart told newspaper men that if pulverized coal can be washed through pipelines it will save millions of dollars building railroad tracks from mines to potential industrial sites near the coal field.

Coal Export Groups

Low-volatile and high-volatile coal producers have formed two separate corporations to work at promoting coal sales abroad and to stabilize coal's overseas markets. Low-volatile coal contains less than 27% volatile matter by weight on a dry basis. High-volatile coal has volatile matter which is 28% or more by weight on a dry basis. High-volatile coals are used principally for coking and steam production. They are often sold for blending with low-volatile coal, which is largely a metallurgical coal.

Membership in the low-volatile coal corporation is composed of producers of

(Continued on p 54)



Hamilton Pyroprene* belt won't add fuel to the fire

Fire hazard and damage is greatly reduced when Hamilton fire-resistant Pyroprene belt is on the job. Accepted for listing by the Bureau of Mines, Pyroprene will not promote burning. Danger of fire spreading along belt is completely eliminated... mine safety and production are safeguarded.

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People in Coal



Ernest J. Gleim, served mining 41 yr.



Eugene E. Quenon, in mining since 1929.

Coal Men Win Department of Interior Awards

Ernest J. Gleim has spent 41 yr doing research on coal-mine safety. He retired in 1956 from the Bureau of Mines' Electrical-Mechanical Testing branch, but his great work in mining-equipment examination has not been forgotten. He has gained the U. S. Department of the Interior's highest honor, the Distinguished Service Award and Gold Medal.

Mr. Gleim hails from Ottawa, Ill. He is an electrical engineering graduate of the University of Colorado. The Bureau of Mines was an infant when he joined the small staff of men assigned to testing equipment to find out whether the equipment would be safe underground. The researchers prepared their own testing equipment and set up rules under which equipment could be tested with fairness to all manufacturers. In this field, Mr. Gleim was a leader. His writings in the field of electrical and mechanical testing are found in more than 50 Bureau of Mines technical publications.

Mr. Gleim taught most of today's Federal coal-mine inspectors how to check mining machines. He was known for his friendly and sympathetic nature. He and staff members went to scenes of disasters, collected evidence, and then ran tests to discover whether defective equipment caused gas or coal-dust ignitions. Besides this, Mr. Gleim has represented the Bureau of Mines on 16 national and international committees concerned with industrial safety.

Mr. Gleim, who lives at 1811 McNary Blvd., Wilkesburg, Pa., still maintains an intense interest in mine safety. Since his retirement he has participated in the completion of a Bureau publication describing mining equipment approved as permissible. *Coal Age* congratulates this man who has done so much for the mining world.

Eugene E. Quenon has received the U. S. Interior Department's Distinguished Service Award and Gold Medal. The award is in recognition of 28 yr of fine service in the Bureau of Mines' health and safety activities. During his career with the Bureau, Mr. Quenon was stationed at Pittsburgh, Pa., Norton, Va., Johnstown, Pa., and Mount Hope, W. Va.

Mr. Quenon was appointed a first-aid miner in 1929, and since that time, has devoted himself unselfishly to his job, often at the risk of his life. After passage of the Federal Coal-Mine Inspection Act in 1941, he assisted in training and indoctrinating the first three groups of coal-mine inspectors employed by the Bureau of Mines. He has supervised all Bureau health and safety work, including coal-mine inspections and accident-prevention, first-aid and mine-rescue training.

Mr. Quenon was not known as a desk man. He participated in rescue and recovery work after some of the nation's worst coal-mine disasters. Once, after a flash flood, he helped six trapped miners escape from a Bridgeville, Pa., mine. To reach them he swam underwater through the mine opening, which was flooded to the roof, and then waded several hundred feet in shallower water inside the mine.

In April, 1945, Mr. Quenon gained the Department of Interior's Award of Excellence and a \$750 cash prize for inventing and patenting an apparatus for testing flame safety lamps. Earlier, he had helped develop the Bureau's present coal-mine accident-prevention courses.

"He maintained excellent relationships between the Bureau and both labor and management organizations," says the citation accompanying his latest award. *Coal Age* extends its best to this fine contributor to safety.



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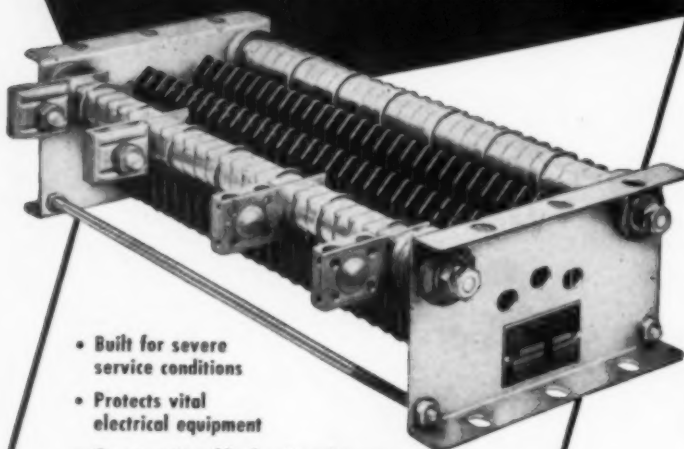
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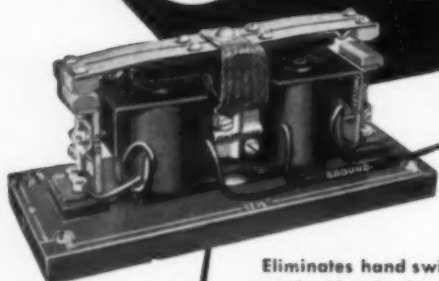
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People In Coal (Continued)

Dr. Charles Lawall, former vice president, Chesapeake & Ohio Ry., has received the Mineral Industry Education Award "for his outstanding achievement as an engineering teacher and university administrator, and for his continuing interest in mineral engineering education during his years as railroad executive." The award, from the American Institute of Mining, Metallurgical, and Petroleum Engineers, was presented to Dr. Lawall during the AIME national convention in New York, Feb. 16-20.

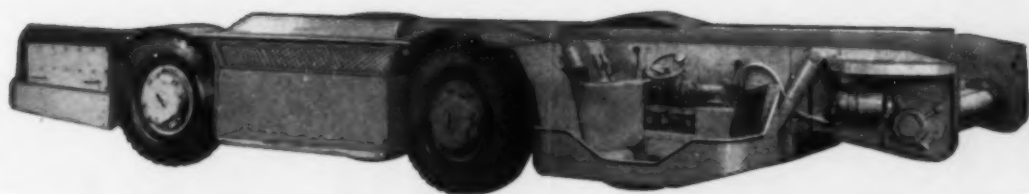
Dr. Lawall received his E.M. and M.S. degrees and an honorary LL.D. from Lehigh University, an honorary LL.D. from Waynesburg College and a D.Sc. from Morris Harvey College. Formerly a geology instructor at Lehigh and professor and director of the West Virginia School of Mines, Dr. Lawall became acting president of West Virginia University in 1938. He was named president of the University almost immediately thereafter, serving in that office until 1945. He joined the Chesapeake & Ohio in 1945 as engineer of coal properties.



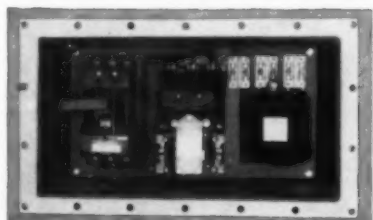
James C. Gray has been named administrative vice president—raw materials for U. S. Steel Corp. He will handle mining production of such raw materials as iron ore and limestone, in both domestic and foreign operations. Mr. Gray, whose most recent position has been vice president—Coal Div., was born in Elco, Pa. He was graduated from Penn State University in 1925 with a bachelor's degree in mining engineering. During the next 12 yr he worked for the Hudson Coal Co. and at one time served as mine foreman of one of the firm's anthracite collieries. In 1937 he became associated with the Tennessee Coal & Iron Div. of the U. S. Steel Co. in Fairfield, Ala., as superintendent of its Wylam mine. Progressing through various management positions in coal and iron-ore mining and manufacturing,



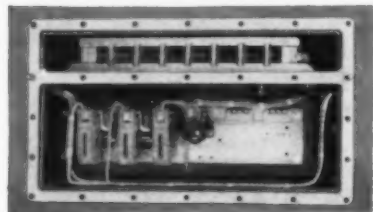
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A. C. Control Panel



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(with resistors and drilled to accommodate Ground Sentinel, if specified)

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SPECIFICATIONS — Model 30

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Base height without sideboards: 30 in.

Length with medium boom: 22 ft. 5¼ in.

Width: 95½ in.

Tire Size: 7.00/15

Tramming speed loaded m.p.h.: low, 1.68; second, 2.73; high 4.25

Capacity level full, cu. ft.: without sideboards, 105

Capacity level full, cu. ft.: with 6" sideboards, 154

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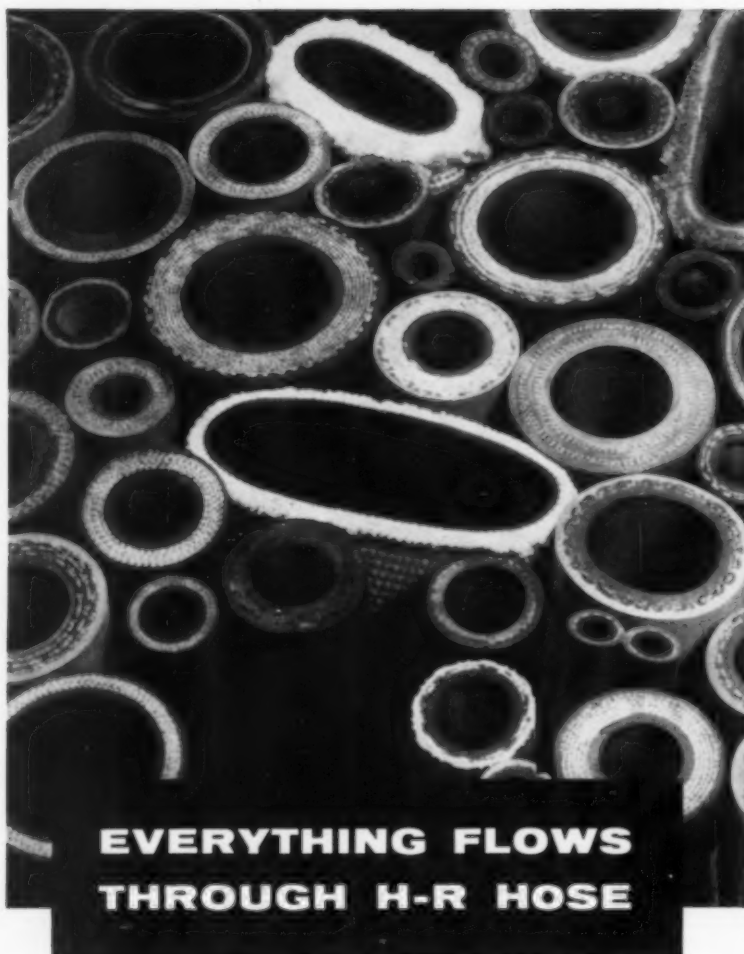
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People in Coal (Continued)

he became in 1950 manager of the division's manufacturing operations. In 1954 he became vice president-coal division of U. S. Steel in Pittsburgh.

R. R. Croke of the Colorado Fuel & Iron Corp., Denver, has been elected president of the Colorado & New Mexico Coal Operators Association. Other new officers are Claude P. Heiner—Minerals Development Corp; W. W. Brown—Edna Coal Co; and O. M. Hanks—Colorado & Utah Coal Co.

George E. Owen has been reelected president of Imperial Coal Corp. J. W. Krous, former general superintendent of mines was elevated to the newly-created position of executive vice president.



Frank R. Zachar has left his engineering spot with Christopher Coal Co. He is going to work in the field of consulting engineering. Mr. Zachar, a graduate of the University of Alabama, started with Hanna Coal Co. in 1944 after prior service with Pittsburgh Coal Co., Eastern Gas & Fuel Associates and Duquesne Light Co. He came to Christopher Coal Co. as general superintendent. Later he worked in engineering projects, the final one being the design and supervision of the Humphrey preparation plant and docks and the Pursglove overland belt-conveyor.

Obituaries

James W. Damron, 61, died recently of a heart attack. He was well known throughout the coal industry for many years. He was associated at one time with Red Jack Coal Corp. and was chairman of the board when that concern was merged with Island Creek Coal Co. a few years ago. Mr. Damron was chairman of the board of the W. M. Ritter Lumber Co. when he died.

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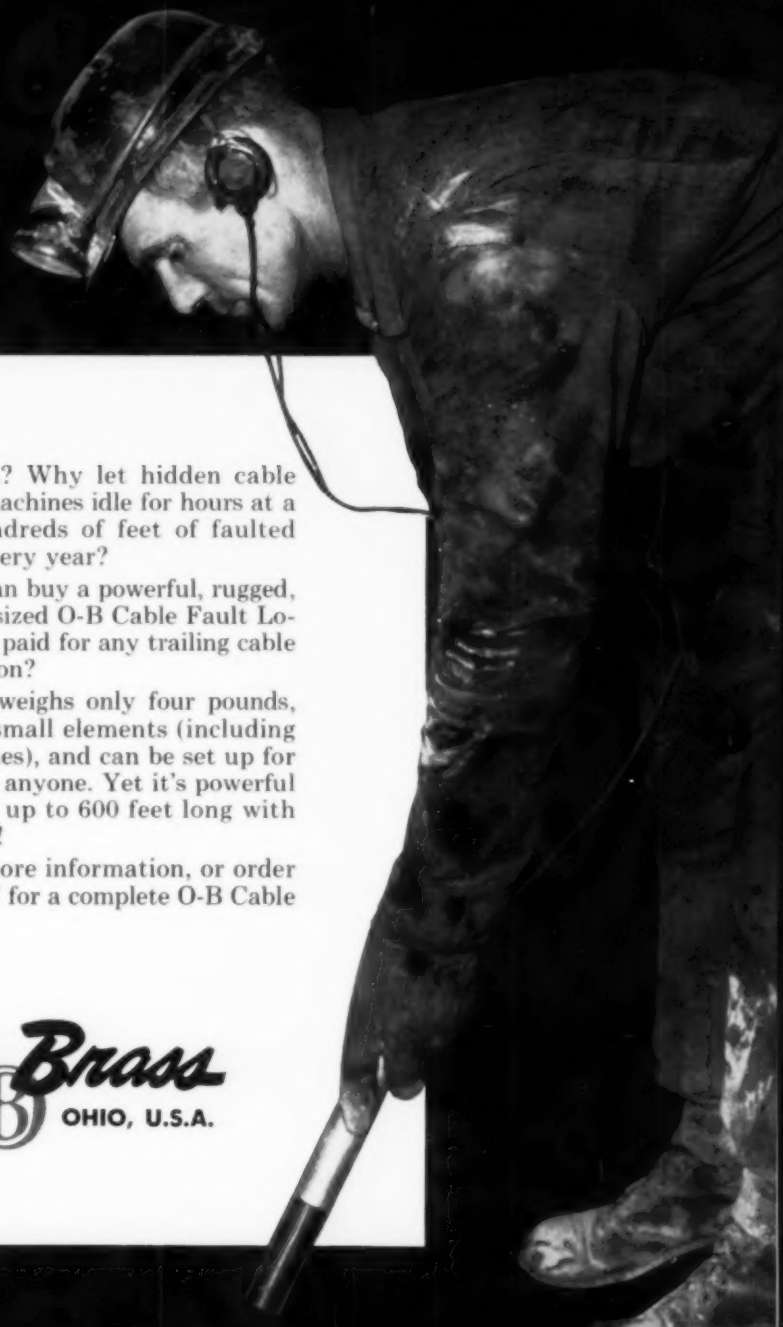
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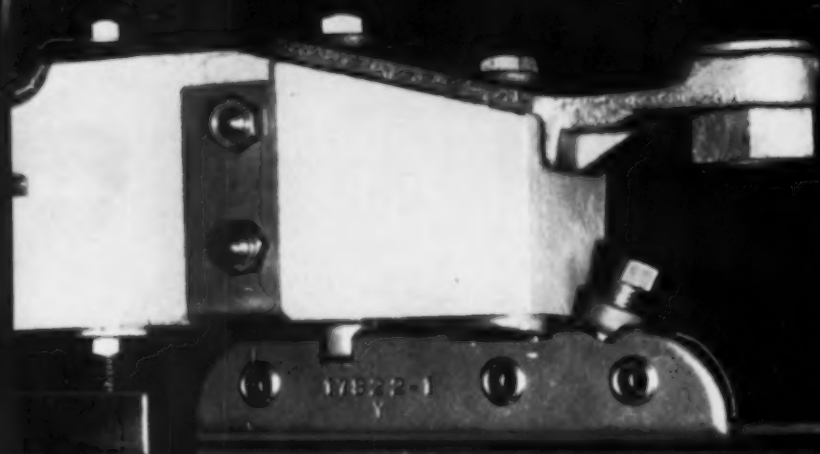
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We practice it and we teach it through the medium of widely distributed O-B publications on roof bolting, O-B film presentations, and thousands of underground O-B bolting tests conducted for mine operators everywhere.

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We produce it in the superior quality of the malleable iron that pours from our own furnaces, and then we cast it into the heavy wall section of the O-B plug, in the four husky "fingers" of the O-B shell, and in the diagonal serrations that improve the grip and eliminate the thin sections of conventional shell serrations. From the broadest concept of roof support safety to the most finite detail of actual manufacture, *safety is our standard!* And that explains why O-B Shells and Plugs are the standard of the mining industry today.

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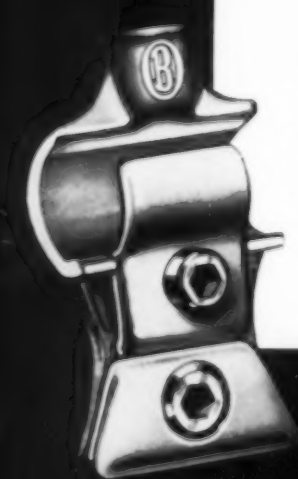
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Coal Abroad

GERMANY

Competition from oil . . . U. S. coal, keeps German coal rates down.

There are 1 million tons of coal lying in the Ruhr Basin, unsold. The total is growing each day by 5,000 tons. As a result there will be no coal price increase of 0.52 dollars as was planned for April 1, 1958. Two sources of competition make this move necessary:

1. United States coal imports have become cheaper in many German regions than German hard coal since a \$1.12 price rise on the German coal last fall.

2. Many industrial and private customers are switching to oil. This trend has been promoted by price cutting on the part of the mineral oil companies. This price cutting is possible due to the drop in tanker freight rates since the Suez crises. Rates have dropped as much as 30%. Also, the oil companies had overrated German demand for oil and thus accumulated large reserves. One of the strongest efforts has been made by Esso (Standard Oil Subsidiary) and BP, who aim at gaining at least 50% of the German fuel-oil market.

The Ruhr coal industry believed that the German mineral oil industry, which by 1965 will have more than tripled its present refinery capacity of 300,000 B/D, would just fill the energy need, but not take business away from coal. The coal industry based this belief on economic estimates of future power demand, but recently, experts have reduced their figures, and it may well be that what has now become the most expensive energy source, the Ruhr coal, will suffer greatly from increasing competition.

RUSSIA

Large-Scale Gasification

Gasification of coal, on which the United States is experimenting to a limited extent, already is being carried on in the Soviet Union on a commercial basis, reports indicate. Bureau of Mines' officials have reported to the House Appropriations subcommittee that a staff member has visited a site in Russia where about 1 million tons of coal has been gasified. It was also stated that some 600 persons, in addition to personnel operating the commercial plants, devote part of their time to underground gasification research in the Soviet Union.

In answer to a question of what kind of coal they have in Russia, it was said that: "Their coals are pretty poor generally and these coals that we under-

stand they are gasifying are brown coals. They are certainly much poorer than they could afford to market by conventional methods and certainly something to which we pay little or no attention."

The Bureau of Mines reported also that gasification tests recently conducted with Pennsylvania anthracite at Dorsten, Germany, showed favorable results compared with other processes now being investigated. The Bureau is planning a prototype plant for experimental work for the development of an integrated anthracite gasification plant, in cooperation with interested anthracite producers, it was reported.

CANADA

Ailing Coal Industry

Western Canada's coal industry stands in bad straits. One of the worst slumps yet has hit that part of the country and the executive board of the United Mine Workers of America, district 18, has telegraphed to Prime Minister Diefenbaker of Canada, urging him to increase subsidies to Canada's coal industry or to impose tariffs on imported United States coal. "We cannot understand," said the telegram, "why the government does not cut U. S. coal imports at a time when the U. S. is cutting Canadian oil imports." One report on the bad situation indicates that there are approximately 2,000 of the 6,000 district 18 memberships either unemployed or on part-time.

OVERSEAS FLASHES

CHINA—Red China predicts that its coal industry, both in output and construction of new pits, will be the biggest in the country's history this year. Peiping radio put the anticipated production at more than 150 million tons, 16.1% more than 1957.

CZECHOSLOVAKIA—The Czechs may move around a few villages in order to get at coal deposits recently discovered under the towns. Suddenly, geologists have found that the nation's actual coal deposits are about 40% larger than estimated one year ago, but the newly discovered coal deposits are under villages and even under larger cities. With production at the traditional fields not able to fulfill drastically increased production goals of this nation, a moving project may be on.

GREAT BRITAIN—A prototype of a "mechanical worm" capable of driving 18-ft-diameter tunnels as pit-bottom roadways, is undergoing tests by the Na-

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screens are for specific results
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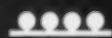
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BEE-ZEE SCREENS

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long-life
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knife-like
accuracy



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prolonged
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GRIZZLY ROD WITH
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ruggedest accuracy

**HIGH
QUALITY**

**FULL
CAPACITY**

Coal Abroad

tional Coal Board in this country. The machine, designed to eat through stone to get to coal seams, moves 200 ft a week—twice the rate of existing machines, according to reports.

AUSTRIA—The 1956 Austrian energy basis (just published in Vienna) states that 32.6% of the Austrian energy was made up by imported coal or coke. Austria thus was only able to satisfy 63.4% of her energy requirements from domestic sources. The trend, however, points at a decrease of foreign coal and coke. The 1952 energy balance showed coal and coke participating with 37.7% only to reach an all-time low of 30.5% in 1955. Feeling is that oil is cutting into the coal market there.

RUSSIA—It is now possible to blow up millions of cubic yards of soil with a sure knowledge of where the enormous mass will fall, report Soviet news sources. The Russians, it is said, have created an earth crater 200 yd across and 45 yd deep with the experimental "controlled explosion" of a 1,000-ton charge. A mass of earth 200 yd across rose as high as 400 yd and spread over an area three-fifths of a mile in radius, say the reports.

HUNGARY—This country is planning to build a giant hydroelectric dam on the River Danube, states a Hungarian paper. Scheduled for completion in 1966, the plant will produce 10% of the country's total power requirements. "Very few supervisory personnel" will be necessary, the report says, since the power station will be fully automatic.

RHODESIA—Wankie colliery, the only coal producer in the Federation of Rhodesia and Nyasaland, is seeking export markets for coal, following production cutbacks by the colliery's biggest domestic customer, the northern Rhodesian copper mines. Wankie can produce 5 1/2 million tons of coal a year, but Rhodesia's railroad system can carry only 4 million tons. At present, Wankie's only export customer is the government of the Sudan.

ARGENTINA—Bids to buy a yearly 700,000 tons of U. S. coal over the next three years will soon be called for by the Argentine Mixed Metallurgical Enterprise-SOMISA (Sociedad Mixta Siderurgica Argentina). The value of the purchase is estimated by Argentine coal importers at \$7.7 million annually, provided the Argentine firm will be able to buy the coal at \$11 per ton f.o.b. U.S. ports. The coal is earmarked for use by SOMISA's steel plant at San Nicolas, some 125 mi outside of Buenos Aires. The plant is scheduled to go into operation by 1960.

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Euclid ***TWIN-POWER***



The use of Twin-Power in earthmoving equipment, developed and pioneered by Euclid, has enabled contractors, mines, quarries and industrial operations to make a far better return on their equipment investment. With two engines, each having a separate power train, bigger loads are moved faster and at lower cost . . . with only one operator.

Euclid's Twin-Power Scraper is a good example of this advanced engineering. With struck capacity of 24 cu. yds. — and 32 yds. heaped — this machine can work independently without the pusher tractor assistance required by conventional scrapers. All wheel drive, powered by two engines providing a total of 518 h. p. through two Torqmatic Drives, gives this "Euc" unequalled work-ability. "Twins" have established new records for high production at low cost on a wide range of work.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio



EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE



Current Coal Patents

By Oliver S. North

Process for the separation according to specific gravity of solids of different specific gravity and particle size, F. J. Fontein and C. Dijkstra (assigned to Stamicarbon N. V., Heerlen, Netherlands), Jan. 14, 1958. Process for specific gravity separation of minerals in hydroclones, using a separating medium. Method is particularly valuable for separation of raw coal into a fraction with low ash content and a fraction with high ash content. The hydroclone used has dimensions significantly different from those of hydroclones generally used for this purpose. No. 2,819,795.

Endless belt trough conveyor, A. W. Duncan (assigned to The Mining Engineering Co. Ltd., Worcester, England), Jan. 28, 1958. An endless belt conveyor for use in underground mining of coal and other minerals. Forward and return runs are superimposed one above the other. Carrying and tension elements are separate and are transposed in relation to one another by twisting at least one element so that the carrying element is supported by the tension element. This

design permits economy in use of materials, simple but durable construction, and driving means of relatively small size for use in tight quarters. No. 2,821,290.


Method for float and sink mineral separation, N. L. Davis, Jan. 28, 1958. Method and system for sink-float separation of coal or other minerals from waste materials. Simplified and accurate means is provided for maintaining constant the specific gravity, viscosity and other characteristics of the parting liquid. Accumulation of non-magnetic material in the bath is prevented by continuous use of a bleed-off duct between bath and rinsing circuits. Medium drawn through duct is passed through a magnetic separator and the recovered magnetic media, commonly magnetite, immediately returned to the bath. Solution containing undesirable clay slimes and the like is discharged from the rinsing circuit to a desliming pump. No. 2,821,303.

Two-way bit, G. Godfrey, Jan. 28, 1958. Design for a drill bit that can be withdrawn easily from coal, rock or the like, regardless of direction and angle

of hole. Cutting teeth are provided on the upper side of the bit to clear the hole as the bit is being pulled, thus facilitating withdrawal of rod and bit. No. 2,821,364.

Coal mining machine having a pivotally mounted cutter tube, H. H. Gardner (assigned to Canadian Ingersoll-Rand Co., Ltd., Montreal, Que., Canada), Jan. 28, 1958. Self-propelled, readily maneuverable mining machine which will load and carry away coal continuously. Provision is made for easily reaching, cutting and removing coal from hard-to-get-at places, such as overhang in a seam. Entire face of coal is recovered without blasting, and workmen can do close supporting work while machine is in operation. Apparatus operates well in pitching seams. No. 2,821,374.

Cutting chains for mining machinery, C. B. Krekeler (assigned to The Cincinnati Mine Machinery Co., Cincinnati, Ohio), Feb. 11, 1958. Construction and arrangement of mining machine cutting chains, whereby packing of cuttings in chain interstices is prevented. Vane-like members on ends of connector elements are so positioned as to lie within the interstices. When chain flexes, the vanes



...You thwart two devils

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ELIMINATE ACCIDENT POTENTIAL...

...CUT DOWN COSTS !

Automatically operated through weight of rolling equipment. Flies open—snaps shut. No attendant required. Trips travel at normal speed—no stopping or starting. Air power operated doors also available. "We estimate our labor savings at \$750,000.00 since 1946 when we installed the first of 60 doors now in use." Challenge this statement. Name supplied on request.



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Other self-liquidating equipment — Mechanical Track Cleaner . . . Electric or Air-operated Track Switch Throwers . . . Air or Manual-operated Car Transfers—Wet or Dry Rock Dusters . . . Cable Splicers . . . Cable Vulcanizers. Write for descriptive brochures.

The Automatic door mechanism that NEVER FORGETS—that NEVER DELAYS!

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Auger at LOWEST Cost With a McCARTHY Coal Recovery Drill because ...

- 1. SELF-MOVING in
any direction**
- 2. 2-MAN CREW for
all augering**
- 3. EASIER
MAINTENANCE**

There's more profit in every ton of coal augered by a McCarthy coal recovery drill.

A McCarthy drill requires only two men to operate. It moves itself from hole to hole without the help of any extra men or equipment. It delivers more tonnage per horsepower than any other coal recovery drill.

A McCarthy drill stays on the job, producing more of the low-cost coal that means extra profit for you. Maintenance costs are lower too. McCarthy drills are designed and built by pioneers in coal recovery machines. They are heavy, rugged and powerful.

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Use McCarthy for More Profit from Every Ton

Manufacturer of Drilling Equipment Since 1901

THE SALEM TOOL COMPANY

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Patents (Continued)

are caused to move, thus breaking up and ejecting accumulations of cuttings. No. 2,822,699.

Shaft or tunnel boring apparatus, J. F. Joy (assigned to Joy Mfg. Co., Pittsburgh, Pa.), Feb. 4, 1958. Boring apparatus particularly adapted to boring substantially horizontal holes in a coal seam, and also suitable for drilling bores vertically or at any angle. Machine has improved supporting, directing and feeding means. No. 2,822,159.

Extensible conveyor, J. Craggs and K. McCann (assigned to Goodman Mfg. Co., Chicago, Ill.), Feb. 11, 1958. Extensible belt conveyor having improved structure for paying out and taking up belt in accordance with length of the conveyor. Storage for additional belting is achieved by a movable carriage having idlers around which a portion of the return reach is reeved. No. 2,822,913.

Electrical cable support for mines, E. C. Whitfield, Feb. 11, 1958. Structure for a simple, adjustable-height overhead support for cables, tubing and the like

in mines at points where the cable or tubing must cross over tracks of a mine railroad system. Support is capable of accommodating heaving of mine floor without damage to the support. No. 2,823,001.

Pivoted chain guide and corner sprocket stripper for boring type mining machine, H. E. Smith (assigned to Goodman Mfg. Co., Chicago, Ill.), Feb. 11, 1958. Improved guide for that part of a mining machine cutter chain between a corner sprocket and a corresponding end of its cutter bar. Additional outward and forward bearing pressure is provided against the portion of chain between cutter bar and corner sprocket. Chain is stripped off of the corner sprocket at proper level. Dirt cannot accumulate beneath the chain. No. 2,823,022.

Boring type mining machine having horizontally extending trimmer bar, E. J. Hlinsky (assigned to Goodman Mfg. Co., Chicago, Ill.), Feb. 11, 1958. Improved form and arrangement of rotary trimmer bars and supporting means therefor. Bars are oscillated in endwise direction while machine is in operation, so as to enhance effectiveness of cutting action with a relatively small number of cutter bits. No. 2,823,023.

Boring type miner provided with percussive tool, L. D. Hagenbook (assigned to Goodman Mfg. Co., Chicago, Ill.), Feb. 11, 1958. Boring type miner having auxiliary percussive means to fragment the core or cusp so that cuttings thereof are readily removed by the machine. No. 2,823,024.

Breaker roller for boring heads, A. R. Biedess (assigned to Goodman Mfg. Co., Chicago, Ill.), Feb. 11, 1958. Design for a special form of discontinuous cutting edge for core breaker rollers. Cutting edge is self-cleaning and accomplishes efficient penetration. No. 2,823,025.

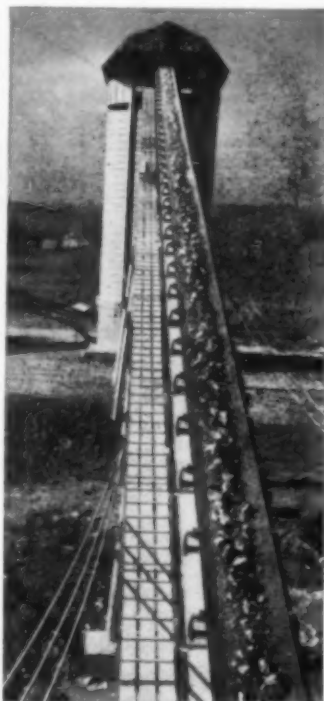
Patents granted in April 1941 are just now expiring, and warrant immediate re-evaluation by coal companies. Among interesting patents issued in April, 1941 is the following:

Shaker screen, W. H. Kutz, Apr. 8, 1941. Shaker screen particularly designed for sorting and sizing anthracite coal into buckwheat, rice, barley and bird's-eye grades. Screen is a metal plate having closely positioned rows of openings. Axes of openings are on an inclined plane with respect to surface of the screen, and are aligned in the direction of flow of the material. Arched edges of openings tend to break up larger pieces of coal, thereby preventing clogging of holes. No. 2,237,491.

BELT FAILURES? Switch to NEW YORK RUBBER!

New York Rubber, famous since 1851, manufactures belt designed to meet trouble—and overcome it! Built for the most severe service demands, there's a New York Rubber belt designed to solve your problem. Mineral mining, quarrying, coal mining—these activities often require a belt that will show superior resistance to sharp and abrasive materials, frequently in the presence of oil and grease conditions. Fire, too, takes its toll of conventional belts.

That's why it will pay you to investigate New York Rubber. A brief description of four of our most popular belts follows. Write on your letterhead for more complete details on these and other superior New York Rubber Belts.



REDUCE FAILURES

with these New York Rubber belts:

STONORE—Highest quality, for most severe service. Handles heavy ores, trap rock, crushed stone, coarse broken glass, slag, cement clinkers, direct feed from digging and mining machinery. Mildew-proof.

DEPENDABLE—For handling coal both under and above ground, sand and gravel, trap rock, sulphur, lime and limestone. Ideal for sub-zero temperatures. Mildew-proof.

NEOPRENE—Resists oil and grease conditions adverse to natural rubber. Handles caustics and coal briquettes. Heat-resistant to 250°F. Mildew-proof.

TEMP-PRENE—A neoprene compounded for fire resistance and severe, rough surfaces. Mildew-proof.

*Acceptance designation: "Fire Resistant, U.S.B.M. No. 28-11".



NEW YORK RUBBER

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Stripping 20 feet of overburden at a mine near Mt. Pleasant, Tenn. This TD-24 rolls full blades of topsoil and clay 150 feet—in only 40 seconds. The blade is an International cable 'dozer. Owner of the outfit: Rochelle and Collison, Mt. Pleasant, Tenn.



**PLANET POWER STEERING...THE BIG DIFFERENCE...
MAKES THE**

TD-24...the rig for stripping

...reports Rochelle & Collison, Mt. Pleasant, Tenn.

Mining contractors, Rochelle and Collison, have compared costs, work-production and profits, and have the answer: the Planet Power steered International TD-24 is tops for tough overburden stripping!

"The TD-24 is the machine for stripping," declares George E. Collison, Jr., for the contracting firm. "Being able to steer under load without stopping one track makes the big difference.

"Planet Power steering plus the fast reverse keeps the TD-24 producing while other machines are loafing.

"For side-cutting (or benching), the TD-24 has no competition. Its rear end doesn't scoot away from the bank—not with the inside track in high range, and the outside in low!"

"Dead-track drag" eliminated

Any king-sized steering-clutch crawler can only give you one-track power on the turns. TD-24 Planet Power steering eliminates power-wasting "dead-track drag." TD-24 full time two-track power means full-load push

or pull on the turns, as well as straightaways!

Exclusive TD-24 Hi-Lo shifting permits instant gear-changing on the go—without stopping or even declutching. Fingertip matching of speed to load under full power speeds production!

Find out how these and all the other TD-24 production exclusives can make the big difference in your profit-making capacity. See your International Construction Equipment Distributor for a TD-24 demonstration!



**INTERNATIONAL[®]
CONSTRUCTION
EQUIPMENT**

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.



This 95 Bottom-Dump Coal Hauler speeds 56-ton loads from strip-pit to plant. Owned by Peabody Coal Company, Freeburg, Illinois.

NEW!

56-ton

CAPACITY

International

Fifty-six tons of coal highball in the big-as-a-freight-car steel body of the new International® 95 Bottom-Dump Coal Hauler.

Three-hundred-and-thirty-five hp of a turbo-charged diesel engine give the "95" its get-away surge and travel speeds up to 38 mph. Choose Torque Converter and Powershift Transmission, or 9-speed constant-mesh transmission! Full-floating planetary axles provide extra, power-cushioning final-drive leverage to handle the "95's" great weight!



95 Bottom Dump Coal Hauler

Air-powered dump doors!

Bottom-dump doors are air-operated, for fast, positive action. Modern power steering adds to "95" operating ease—helps give this hauler its good turning radius. Operator comfort and safety of the mine-tested "95" are the same as the already-famous 95 Payhauler®!

Try the performance of this mass-producing, big-tonnage, off-road coal hauler. See your International Construction Equipment Distributor for details.



***International
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International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.



In this mine, slate is separated from coal underground and carried on another Quaker conveyor belt to the slate pile.

For fire-safety and ruggedness underground, SPECIFY QUAKER FIRE RESISTANT CONVEYOR BELTING U.S.B.M. 28-11

Jagged chunks of coal and slate fall ten feet from the entry belt to this Quaker mother belt in one underground tippie. After 2½ years of constant service, the 2500-foot belt is still as good as new.

Now made especially for underground use where fire-resistance and flame-retardancy are musts, Quaker belting meets U.S. Bureau of Mines Designation U.S.B.M. 28-11... in fact, far exceeds the standards set for it. For example, test flame was extinguished immediately, and afterglow disappeared in one-third the permitted time.

Call your Quaker industrial distributor for the full story, and for valuable assistance on all problems involving industrial rubber products.



FREE BELTING CATALOG

For complete information on all standard grades of Quaker conveyor belting, send for this illustrated catalog. Write QUAKER RUBBER DIVISION, H. K. PORTER COMPANY, INC.; Philadelphia 24, Pa., or Pittsburgh, California.

H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION

New Books

Pumping

Pump Operation and Maintenance, by Tyler G. Hicks. How to operate and maintain pumps used in industrial, municipal, central-station, marine, institutional and similar installations is shown in this manual. It is designed to what supervising engineers, operators and maintenance personnel need to know throughout the life of the pump. Every major class and type of pump is covered, with specific, step-by-step instructions for installing, starting, routine operation, periodic maintenance and major overhaul. 275 pp. 6x9-in; cloth. \$9. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y.

Personnel Relations

Handbook of Personnel Management and Labor Relations, by Dale Yoder, H. G. Heneman, J. G. Turnbull and C. H. Stone. This authoritative practical guide covers the problems of handling major functions of personnel and labor relations effectively from recruitment to retirement. The authors, all authorities in the field, have coordinated, analyzed and synthesized a blend of theoretical, technical, and practical material of value to employee-relations directors, training directors, and wage and salary administrators. 1,216 pp. 5½x8-in; cloth. \$12.50. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y.

Ohio Coal Beds

Coal Beds of the Conemaugh Formation in Ohio, by T. A. DeBrosse is one of a series on the coal measures of Ohio. It summarizes the known information about the coal beds in the Conemaugh formation and is designed to serve as a guide to coal operators and land owners in evaluating holdings as well as in prospecting for areas of minable coal. 33 pp. 8½x11; paper. *Report of Investigation No. 34.* 50¢. Ohio Division of Geological Survey, Orton Hall, The Ohio State University, Columbus 10, Ohio.

Anthracite Flood Prevention

Mine Flood Prevention and Control, by S. H. Ash, H. A. Dierks and P. S. Miller. This is the final report of the anthracite flood-prevention project engineers whose task was to obtain information and to present a solution relating to the health, safety and economic conditions in the anthracite region of Pennsylvania. The engineering survey, summarized in this report, included studies of acid mine water, underground water pools, flooded reserves, mine pumping plants, seepage, barrier pillars between mines, and geologic features of the region. 100 pp. 8x10½-in; paper. Bulletin 562. 60¢. Superintendent of Documents, U. S. Govern-

ment Printing Office, Washington 25, D. C.

Testing Standards

ASTM Standards on Coal and Coke brings together in convenient form all ASTM standards on coal and coke. The volume is of particular significance to public utilities, exporters and importers of solid fuels, process industries maintaining their own power facilities, government departments and transportation companies. 142 pp. 6x9-in; paper. \$2.50. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Equipment Approvals

Nine approvals were issued during January.

Goodman Mfg. Co.—Type 93-T19-30 rope belt conveyor; one two-speed motor, 20 hp at 850 rpm or 40 hp at 1700 rpm, 230 V, DC. Approval 2-1324, Jan. 7.

Joy Mfg. Co.—Type 5CM-18H miner; four motors, one 15 hp, one 30 hp, two 100 hp, 440 V, 60 cycles, AC. Approval 2-1325A, Jan. 16.

Jeffrey Mfg. Co.—Type ML81A loader; five motors, two 20 hp, two 15 hp, and one 4 hp, either 415 V, 50 cycles or 440 V, 60 cycles, AC. Approval 2-1326A, Jan. 16.

Joy Mfg. Co.—Type XB30R-8E extensible belt conveyor; three motors, one 25 hp and two 15 hp, 250 V, DC. Approval 2-1327, Jan. 17.

Jeffrey Mfg. Co.—Type 61WH chain conveyor; one motor, 30 hp, 220 V, 60 cycles, AC. Approval 2-968, Jan. 17.

Salem Tool Co.—McCarthy underground coal auger; one motor, 60 hp, 440 V, 60 cycles, AC. Approval 2-1328A, Jan. 22.

Joy Mfg. Co.—Type PL11-25RPH portable elevating conveyor; one motor, 25 hp, 440 V, 60 cycles, AC. Approval 2-1329A, Jan. 28.

Joy Mfg. Co.—Type XB36R-1h 36-in extensible belt conveyor; four motors, one 60 hp, two 15 hp, one 7½ hp, 440 V, 60 cycles, AC. If used with a bridge conveyor, add one 7½-hp motor. Approval 2-1330A, Jan. 31.

Dart Truck Co.—Type 135-UG diesel shuttle car; for use in noncoal mines. Approval 2415, Jan. 6.

bending fatigue... is this your wire rope problem?



FREE Red-Strand Service Bulletin No. 105 brings you the answer you're after!

Do broken wires start showing up much too soon after you put a new wire rope into use? If so, costly bending fatigue is probably the explanation. Fortunately much of the expense it causes can be eliminated by following the simple procedures explained in Red-Strand Wire Rope Service Bulletin No. 105. This is one of a series devised to help wire rope users get better service without spending more money. Copies are sent on request. Write H. K. Porter Company, Inc.—Leschen Wire Rope Division, St. Louis 12, Mo.



H. K. PORTER COMPANY, INC.
LESCHEN WIRE ROPE DIVISION



The 516 MT has long been a favorite with coal miners. It can raise $5\frac{1}{2}$ tons as much as $9\frac{1}{2}$ inches, is only 16 inches high when closed and has the famous oblong rack bar for greater strength and dependability.

A ratchet jack such as the Duff-Norton all-purpose 516 MT is no stronger than its rack bar—the notched steel bar which moves up and down supporting the load. The forged-steel rack bar on this five-ton capacity mining jack is stronger than the rack bar on any other make. *It's stronger because it's larger.*

Even a brief examination of the jack will confirm the truth of this statement, for the bar on Duff-Norton jacks is oblong, while that of other makes is square.

Ask your distributor for information on Duff-Norton coal mining jacks—there is a Duff-Norton jack for every pulling, pushing or lifting job in the mines. Or, write the world's oldest and largest manufacturer of lifting jacks for a copy of AD-10-J, "A Handy Guide for Selecting Duff-Norton Mine Jacks."

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COFFING HOIST DIVISION • Danville, Illinois

DUFF-NORTON JACKS

Ratchet, Screw,
Hydraulic, Worm Gear



COFFING HOISTS

Ratchet Lever
Spur Gear, Electric

Preparation Facilities

Westmoreland Coal Co., Hampton No. 3 mine, Hampton Mines, W. Va.—Contract closed with Deister Concentrator Co., Inc., for six Concenco No. 77 Diagonal Deck coal washing tables for cleaning $3/8 \times 0$ coal; and one Model 308 Concenco revolving feed distributor for feed distribution to the six tables.

Carbon Fuel Co., No. 6 mine, Winifreda, W. Va.—Contract closed with Deister Concentrator Co., Inc., for one SuperDuty Diagonal Deck No. 7, Model HCRD coal washing table for cleaning $1/4 \times 0$ coal.

Jeddo Highland Coal Co., Midvalley colliery, Wilburton, Pa.—Contract closed with Deister Concentrator Co., Inc., for one Super-Duty Diagonal Deck No. 7 coal washing table to handle rice and barley sizes of anthracite coal.

Feds Creek Coal Co., Inc., Biggs, Ky.—Contract closed with Kanawha Mfg. Co. for Lecco picking and classifying screen with required conveying equipment to deliver 5×0 coal to existing washing facilities and the classified clean sizes to their respective loading points. Capacity 300 tph.

Slab Fork Coal Co., Alpoca, W. Va.—Contract closed with Kanawha Mfg. Co. for a 6 ft x 6 ft disc Agidisc coal filter with entire filtration system mounted on one platform. Capacity 10 tph of dry filter cake discharge.

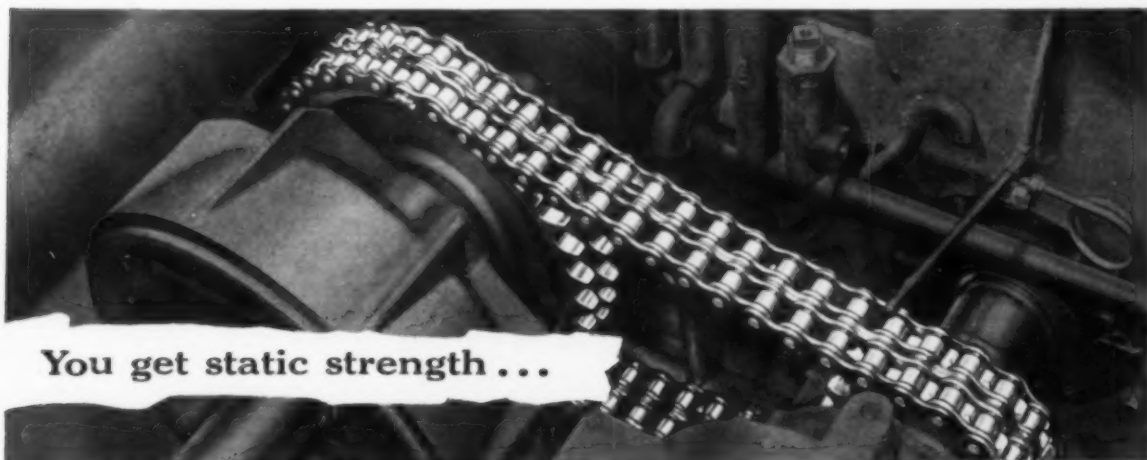
Valley Camp Coal Co., Triadelphia, W. Va.—Contract closed with Robert Holmes & Bros., Inc., for one Baughman No. 300 thermal coal dryer. Estimated feed to dryer 100 tph of $3/4 \times 1/4$ coal.

Central Farmers Fertilizer Co., Montpelier, Idaho.—Contract closed with Robert Holmes & Bros., Inc., for one Baughman Model 7XB thermal coal dryer. Estimated feed to dryer 25 tph of coke or 60 tph of silica.

Pine Township Coal Co., Heilwood, Pa.—Contract closed with Robert Holmes & Bros., Inc., for one Baughman No. 300 thermal coal dryer. Estimated feed to dryer 110 tph of 38×0 coal. Surface moisture of coal to be reduced to about 3%.

Gay Mining Co., Liberty mine, Gilbert, W. Va.—Contract closed with Daniels Co., Contractors, Inc., for a complete DMS dense-media preparation plant and loading facilities to prepare 8×10 ROM coal. Overall capacity 350 tph. Completion expected summer 1958. Heyl & Patterson, Inc., will supply a fine coal preparation plant for 120 tph.

Why tough-service drive and conveyor jobs demand LINK-BELT roller chain



You get static strength ...

RESISTANCE TO TENSILE STRESS is achieved with properly heat-treated, accurately machined side bars made of premium steel and fitted with properly hardened pins, bushings, rollers.



plus dynamic strength

STRENGTH OF CHAIN IN MOTION results from such refinements as pitch-hole preparation, micro-finish of parts, special processing of side bars, pre-lubrication, rigid quality control.

THE greater dynamic strength found in Link-Belt precision steel roller chain is essential for long life on today's harder-working drives and conveyors. This added capacity to resist shock loads, centrifugal loads and similar stresses is achieved only because Link-Belt adds refinements in manufacture.

These include lock-type bushings, shot-peened rollers, pre-stressing, closer heat-treat control. The result: a precision chain that takes stresses in stride ... provides smoother, more efficient performance

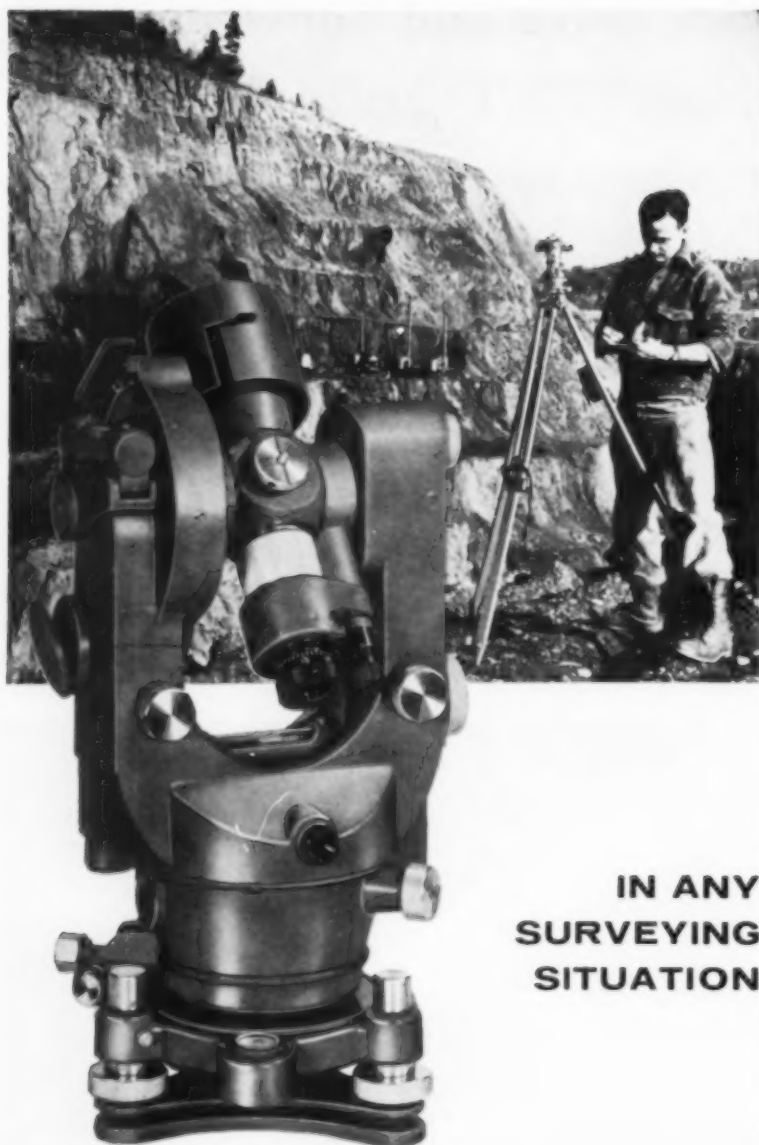
that measurably outlasts ordinary roller chain—reduces costs.

For full data on Link-Belt roller chain, see your Link-Belt office or authorized stock-carrying distributor.

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ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

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Upper and lower motions for setting on zero and for repeating. Built-in optical plummet.

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News Roundup (Continued)

this type coal in bituminous coal Districts 1, 3, 7 and 8, located mainly in West Virginia and Virginia. The high-volatile coal corporation has producers of this type coal from coal-mining areas in the eastern United States, where high-volatile coal is mainly produced. Joseph Moody, president of the Southern Coal Producers Association is temporary chairman of the low-volatile coal group and president of the high-volatile organization.

Both corporations will aim at getting together information on foreign market requirements, import quotas, tariffs, currency restrictions, credits and other data bearing on setting up new markets abroad for coal. Members of both organizations will cooperate in the exchange of information and in establishment of fair export prices.

Mines, Companies

Trees, 394,800 of them, will green up things in various Harrisburg, Pa., communities where mine stripping has been conducted.

Bids have been made for planting on 329 acres in Harrisburg and 266 acres in Lackawanna County, as well. The trees are to be rooted in the spring and fall.

Philadelphia & Reading Corp., after many lean years, is thriving at a time when the general economic picture in the country is not cheering.

Last year, the firm earned \$6,606,253 equal to \$5.69 a share. Dividends have been declared for the first time in some years. Philadelphia & Reading has branched out into the apparel field and is planning to diversify still more, according to reports.

Peabody Coal Co. has three damage suits on its hands for alleged damages to property in Taylorville, Ill.

The suits state that the firm had the right to mine coal under the damaged property, and due to negligence in mining operations the property subsided, with resulting injury to the complainants' homes.

A guillotine-like coal-cutting device is being tested by the Pennsylvania Dept. of Mines.

The device is said to be capable of cutting as high as 75 tons of coal in a single shift. This production would be about 50% greater than hand mining. The department hopes that the machine will give the anthracite industry a boost.

West Kentucky Coal Co. has approved a proposal to mortgage its prop-

How rubber-tired mobility speeds pit production — increases profit

Only a rubber-tired tractor can readily travel from job-to-job in your pit or plant operations. It runs at speeds to 17 mph, shuttles fast between shovel clean-up and other assignments. The operator just shifts into high gear and your tractor is on its way, via haul road or across the pit floor to its next job, whether to strip overburden, level stockpiles, tow other equipment, or switch railroad cars.

Larger pit areas, and higher production requirements, make it necessary to have equipment that can move around fast and easy on its own power.

So the need for high-speed mobility is increasing each year, while the time and cost of moving track-type equipment designed for limited area work becomes higher and higher, cutting profits more and more.

In the light of these developments, it will pay you to consider the importance of *mobility* as a necessary tractor requirement in your pit operations.

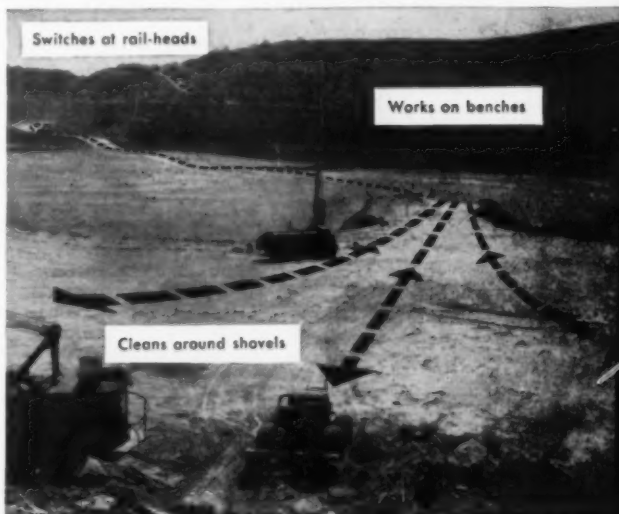
Get all 4... power, traction, speed and mobility... with Tournatractor®

Tournatractor is a modern tractor designed to provide ample *power, traction, speed and mobility* for scattered pit operations. It does not offer as much drawbar horsepower at speeds below 2 miles per hour as do track-type tractors of equal engine horsepower. But for pit operations where you can capitalize on *speed and mobility* — we suggest you consider the *new* Tournatractor. The cost is 10% below that of track-type tractors with torque converters and comparable engine horsepower... and maintenance costs are lower.

There's a bonus-value for you in today's improved Tournatractor. A railroad coupler attachment is now available, converts this machine quickly to a practical SwitchTractor®. With coupler at one end, and dozer at the other, unit does double-duty... makes it an even more profitable tool for your pit operations. Your LeTourneau-Westinghouse Distributor will be happy to arrange a demonstration of a Tournatractor in your pit, to prove that its special work advantages — *speed and mobility* — can pay real dividends for you. Ask him now... or write the factory.



Rubber-tired tractor travels at speeds up to 17 mph on work-and-run assignments. Operator can drive over pit floors, or off road. He can road his machine over tracks, ties, switches, and paving, without damage.



Sketched lines show range of rubber-tired tractor in typical mine. In foreground, tractor cleans-up around shovel. It ranges over entire pit floor for dozing, and on benches bordering the pit. Rail-head is only a few minutes drive away for switching work.

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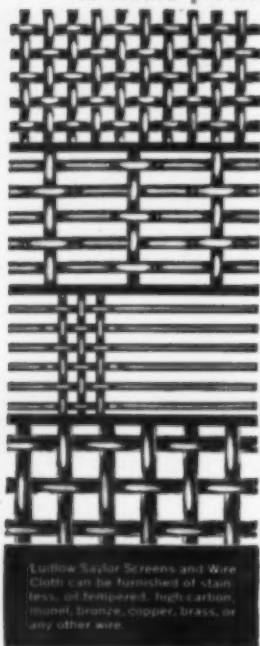
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Mines, Companies (Continued)

erties for loans not to exceed \$12,000,000, according to a report.

Of the proceeds \$4,700,000 would be used to repay existing bank loans, and about \$5,000,000 to increase capacity of mining properties and add marine equipment.

Plans for the opening of a new mine and erection of a modern coal-preparation plant at Benham, Ky., have been revealed by International Harvester Co.'s Wisconsin Steel Div.

The new mine is to be opened in Benham spur of Black Mountain near the center of town. It will be ready by 1959, said a spokesman. Tests have shown the coal to be excellent in metallurgical quality and fine for coking and by products. The site is near International's present tippie at Benham, but will be an entirely separate operation.

Colorado & Utah Coal Co.'s Harris mine has been shut down.

The Harris mine, which has operated since 1914, employed 89 men. It is in northwestern Colorado. Company officials say that "economic conditions" make the shut-down necessary. Colorado & Utah Co. stockholders have voted to liquidate the firm.

Utilization

Rockets may be flying with coal fuel . . . this from West Virginia.

A public information specialist with General Electric's missile system has said that West Virginia may be an important contributor to missile propulsion and construction. "The enormous appetite missiles have for fuel and the great strides made recently in fuel research," said the specialist, "may make West Virginia's tremendous coal resources a potential source of rocket fuel." Also, he said, West Virginia is a leader in the glass industry, and fiber glass and other silicon-based ceramics are widely used in the missile field.

Pickles and coal for pregnant women, these two items head the list in a survey made recently in Canada.

According to one report, the survey indicated that seven out of ten women crave a lump of coal during the latter months of pregnancy. Could be a brand new market for coal if the advertisers get going.

A \$1,299,800 contract for 260,000 tons of East Tennessee coal has been awarded to Bessemer Coal, Iron & Land Co. of Birmingham, by the TVA, it has been announced.

The TVA has also given contracts to



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Royalties slashed 50% on AKREMIT[®]

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Designed and carefully compounded to give high energy, greater safety, easy loading, uniformly reliable results. Here's how to trim your overall costs to the bone.

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Either way, you save blasting dollars, because the proven reliability of Akremite makes it the most economical blasting agent you can use—and now the royalties have been cut in half. This also applies to the new improved formulation now available.

You can use Akremite for stripping, open-pit mining, or other large diameter shooting. Besides saving

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High Energy. Excellent blasting efficiency, as proven by the experience of large bituminous-coal strip pit operators and others under a wide variety of conditions.

Increased Safety. Can't be detonated by blasting caps, friction, shock or even standard "Primacord." Relatively insensitive Nitramite[®] primers or properly sized dynamite or non-nitroglycerin primers are necessary to do the job.

Fast, Easy Loading. Akremite is packaged in moisture-resistant plastic bags which are flexible and conform to the shape of the borehole to give maximum loading density and performance. They are easy to handle, and easy to load.

There's no Nitroglycerin in Akremite, either, so you have no "powder" headaches.

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BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY

Utilization (Continued)

other companies in the area, mostly for purchase of heavy machinery.

A new steam plant is under construction on the Coosa River near Wilkesville, Ala.

The Alabama Power Co., which is building the plant, will open, early this year, a new coal mine in the western section of Shelby County, to produce coal for the large steam plant. The plant is expected to be ready by 1960.

Judge Jesse Fell Anthracite Day was celebrated on Feb. 11.

The day commemorated the first successful burning of anthracite in an open grate. One-hundred fifty years ago Judge Fell performed that experiment, which marked the beginning of the hard coal industry.

Purchase of Washington coal by the federal government, for overseas shipment, is being urged by Gov. Albert D. Rosellini of Washington.

Hopes are that coal from the Roslyn-Cle Elum area, that has been officially declared a distressed employment area, will be shipped overseas for use in Korea.

Mining men in Kittitas County, Wash., have renewed efforts to receive a portion of the Hanford Works coal contract for fiscal 1959, to help bolster the county's sagging coal economy.

Representatives of mining are urging consideration of the coal mines in the Roslyn-Cle Elum area when the Hanford contract comes up for bids in late spring.

Paper bags that can be used as throw-away ash containers are being tested by Scranton-Lehigh Coal Co. for Union Bag & Paper Co.

Bags will be tested on various types of hand-fired units. They will be inserted in cans before being placed in the ashpit or in cans into which ashes are shoveled. Then bags will be filled, tied and carried out for collection. The bags are said to be waterproof, fireproof, dustproof.

A new kind of coke may lead to increased development of the steel industry in the West.

Experiments sponsored by Food Machinery & Chemical Co. of New York involve a fluid-charring step in making coke. The new principle calls for coal to be ground into a fine consistency and held in suspension in a chamber

by an upward moving blast of hot air. As the coal is heated, tar, light oil and other by-products move up, gaseous form, and out of the chamber to condensing units. The coke remains behind.

A \$34,000,000 steam power plant near Kemmerer, Wyo., will be built by Utah Power & Light Co., it has been announced.

The plant will use strip-mined coal from the area. The project will consist first of a 150,000-kw generating unit near the Elkol coal fields of the Kemmerer Coal Co. A dam and storage reservoir upstream on Hams Fork River and necessary piping facilities will supply water for plant cooling. Completion is planned for 1963.

A new process for getting high-grade alumina from low-grade ores and coal-mine wastes will be developed by Strategic North American Corp.

The firm is a joint arrangement between North American Coal Corp. of Cleveland and Strategic Materials Corp. of Buffalo. Strategic Corp. will build and operate plants for production of alumina and aluminum sulfate.

Sales of water-cooled grates hit a



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This popular ferrous medium is available in three grades: A Grade (max. 5% on 100 mesh, 55-70% thru 325 mesh); B Grade (90% min. thru 325 mesh); C Grade (all thru 65 mesh, approx. 50% thru 325 mesh). Write for details.



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HINGED PLATEGRIP BELT FASTENER No. 500

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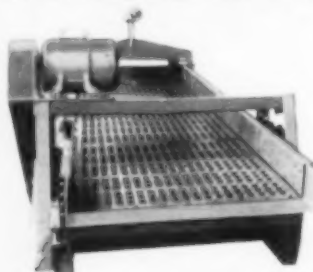
These heavy-duty belt fasteners make a strong, flexible joint in conveyor belts, belts of any width and of from $\frac{3}{8}$ " to $\frac{1}{2}$ " thickness. They offer special advantages in mines, quarries or industrial setups where length or position of belt is frequently changed, because sections can be removed or added at will. Joints are opened for this purpose by simply pulling out the hinge pin.

Easily and quickly applied on the job or in the shop. Special design gives deep compression into belting and smooth, flush joint.

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Tough and rugged Hendrick H Quality Steel Perforated Plate lasts longer, even under continuous and heavy-duty use, because it is made from heat-treated high-carbon steel. It screens coal easier and faster, while the full clearance of its perforation reduces downtime costs due to blinding. Product uniformity is assured throughout the life of the screen. For all these reasons, Hendrick H Quality Steel

Plate can make the difference between profit and loss in coal preparation. Order Hendrick H Quality Steel with either flat, corrugated, or stepped surfaces, in any desired shape and with any size of perforation. Whatever you order, you get Perforated Plate which reflects Hendrick's 82 years of experience in selecting the steel the mining industry needs.

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Utilization (Continued)

new high in 1957, and reports indicate that increased business may be expected.

The savings and well-regulated heat, possible with water-cooled grates, in the remodeling of old schools or the erection of new buildings are being made known to possible users in a new anthracite campaign.

Accidents

A coal-mine cave-in buried one miner and injured another in the Crown Coal Co. mine at Farmerville, Ill.

The two men were caught in the rock fall as they attempted to put in new supports. The buried man, Kenneth Rose, a superintendent, was crushed to death.

A slab of roof weighing about 560 tons fell in the Amherst Coal Co. mine at Lundale, W. Va., crushing to death five miners.

Rescue workers, using huge hydraulic jacks and laboring frantically but without hope, freed the bodies of the men. They were: Arthur Jack-section foreman; Elmer Broady-machine man and driller;

Earl Johnson-roof-bolt machine operator; James Rogers-roof-bolt machine operator; and William Collins-a machine man.

A rock fall injured laborer, Joseph Raymond, at the Wanamie colliery, Glen Alden Corp.

He was removed to Nanticoke State Hospital and was suffering from numerous lacerations of the back and feet.

Labor and Coal

The Pennsylvania State Workmen's Compensation Board has upheld two miners' asthma benefit awards.

Both men worked for Glen Alden Corp. The cases had been appealed by the Commonwealth that had been ordered to pay all the compensation. The ex-miners had worked while exposed to the silica hazard in the mines and had suffered disabilities.

A court decision awarding \$3,403 to a Plains Township (Pa.) mine worker has been upheld.

Joseph Cusick, the worker, was injured October 5, 1954, while working for No. 14 Coal Co. A compensation agreement was made up and he was paid benefits. He signed a final receipt on May 5, 1955, but found, six days later, that he was still unable to work. The court decided that a receipt for and signed under the false belief that one has recovered is not completely binding if proof of continued disability is shown.

Bituminous Output

YEAR TO DATE	PRODUCTION
February 15, 1958	52,776,000
February 16, 1957	65,236,000

1958 output 19.1% behind 1957.

A month earlier output was 21.9% behind 1957.

WEEK ENDING	PRODUCTION
February 15, 1958	7,965,000
February 16, 1957	9,750,000

Anthracite Output

YEAR TO DATE	PRODUCTION
February 15, 1958	2,996,000
February 16, 1957	3,808,000

1958 output 21.3% behind 1957.

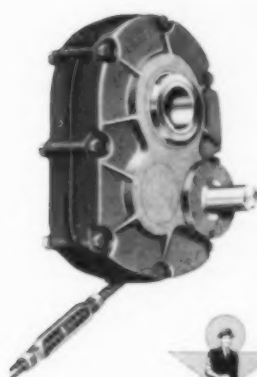
A month earlier output was 21% behind 1957.

WEEK ENDING	PRODUCTION
February 15, 1958	379,000
February 16, 1957	421,000

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Royalty Smokeless Coal uses ABC's Scales to keep accurate check on production

ABC's Scales at Royalty Smokeless Coal Company, Clifftop, W. Virginia, prove best for weighing and totalizing run-of-mine coal going into preparation plant. Operators asked for and are now getting:

1. A scale that plant people can operate.
2. Ease of installation and maintenance.
3. Continuous weighing, accuracy of $\frac{1}{2}$ of 1%.
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Improving Mining Methods, Safety And Coal Preparation

Achievements and new techniques in coal-industry operations highlight annual meeting of AIME.

CONTROLLING MOUNTAIN BUMPS. Designing today's preparation plants and applying industrial engineering were among major themes in seven technical sessions of the Coal Division at the annual meeting of the American Institute of Mining, Metallurgical and Petroleum Engineers at New York, Feb. 17-20. Following are abstracts of the technical papers presented at the sessions:

Bump Control

Activity of the Bureau of Mines in Bump Investigation and Research. Edward Thomas, mining engineer, U. S. Bureau of Mines.

Slabbing, splitting pillars, development in abutment zones and other unfavorable mining practices contribute to, or are basic causes of bumps. The greatest need today is the ability to compromise with known principles so that areas already committed to unfavorable mining practices started in the past can be mined with a maximum of safety.

Much work remains to be done from the standpoints of tying geological conditions to occurrences; instrumenting pillars for loading and gathering data on strength of coals, bottom and roof to make the prediction of bumps more certain; and in the analysis and prediction of regional bumps.

Ground Stress Investigations in Canadian Coal Mines. A. Brown, head, mining section, Department of Mines and Technical Surveys, Ottawa, Canada.

Studies of loading or artificial supports on two long walls indicate that the highest rate of support loading and the highest rate of convergence occurred in approximate the same position on the working face. Increased depth did not significantly modify the position of maximum loading on the exposed edge of a massive coal block. More significant are the type of face operations and the speed of advance.

Bumps in the McGillivray mine in Western Canada are usually associated with pillar splitting. Smaller original pillars have lower capacity for storing strain energy. Apparatus for studying stress changes in the solid indicate that mining-induced stresses are detectable inside large pillars at appreciable distances ahead of an extraction line.

The Occurrence of Mountain Bumps at the Sunnyside Mines, Kaiser Steel Corp. John Peperakis, manager, Sunnyside coal mines, Kaiser Steel Corp. (read by C. T. Holland).

The possibility of the unusual type of bump having its origin at a fault structure cannot be discounted. Seven distinct instances of bumps at Sunnyside show why this possibility exists. Measures taken at Sunnyside to minimize the bump hazard are as follows:

1. Long-hole shooting.
2. Cutting up large blocks into smaller more uniform pillars ahead of the retreating pillar line.
3. Elimination of connecting rooms from one entry to another.
4. Breaking up entry blocks into uniform size ahead of pillaring.
5. Use of maximum roof support in bump areas.
6. Application of yieldable steel-arch supports in slopes and haulways where unusual bumps are liable to occur.
7. Hydraulic backfilling.

Progress in the Control of Mountain Bumps in the Pocahontas No. 4 Seam. Woods G. Talman, general superintendent, and John L. Schroder Jr., chief engineer, Gary District, U. S. Steel Corp.

Considerable progress has been made in the past 4 yr with auger drilling to relieve stresses in pillars and thereby control bumps. A major problem in the drilling has been the difficulty of keeping the auger on the bottom. Experience shows that a drilling rate of 10 in per min keeps the auger on the bottom. Drilling results prove that (1) pillars known to be heavily stressed can be drilled successfully, (2) mountain bumps can be triggered by drilling into loaded pillars without jeopardizing workers, and (3) loaded pillars can be stress-relieved by drilling large-diameter holes with underground augers and the pillars remaining can be mined normally.

The Cause and Occurrence of Coal Mine Bumps. C. T. Holland, head, department of mining engineering, Virginia Polytechnic Institute.

Rock bursts in coal mines occur when the cover is 500 ft or more, composed of strong members and the floor does not readily heave. Other factors are a mountainous surface, steeply pitching

beds and proximity of faults and folds. The fundamental cause of bumps is the failure of brittle material from excessive stress. A study of 163 pillar bursts shows that 68% occurred on pillar line points, 14% probably on pillar line points, 4% probably not on pillar line points, 12% definitely not on pillar line points and 2% unclassified. If a mine is to be operated under conditions favorable for the occurrence of bursts, operations should be planned to eliminate mining practices favorable to their occurrence.

Deep Coal Mining in No. 2 Mine, Springhill, N. S. W. F. Campbell, resident superintendent, Cumberland Railway & Coal Co., Springhill, N. S. (read by A. Brown).

The No. 2 mine is one of the deepest coal mines operating today, with current operations under 4,400 ft of cover. Mining methods were changed as workings became deeper from bord and pillar to longwall. Stone walls 10 to 12 ft wide on 40- to 50-ft centers eliminated face bumps. As a result of experience a set of rules for both bord and pillar and long-wall mining were established by the company.

Coal Mine Bumps Can Be Eliminated. H. E. Mauck, general superintendent, Olga Coal Co.

If the geological conditions necessary for bumps are present, they should be considered when planning a mine. Some of the recommended practices include driving as few entries as possible, leaving wide barriers, full extraction of pillars, mining on full retreat, uniform size of pillars, short straight pillar lines, rapid extraction, and adequate, but not excessive timbering.

Coal Preparation

The Moss No. 2 Preparation Plant. Richard Joslin, Clinchfield Coal Co., and W. C. Gerler, Link Belt Co.

Heavy-media cleaning of 4x¼-in coal in a Link-Belt drum-type vessel and wet-table cleaning of the ¼x0 on Deister SuperDuty tables are principal processes at the new Moss No. 2 cleaning plant. The coal is mined from high-volatile Tiller seam, and features a heating value of more than 15,000 Btu per lb. Also included in the fine-coal circuits are cyclones and an 80-ft thickener, four centrifugal dryers and three Multi-Louvre thermal dryers equipped with cooling sections. A feature of the heavy-media system is Accuray control of the

You, too, can reduce



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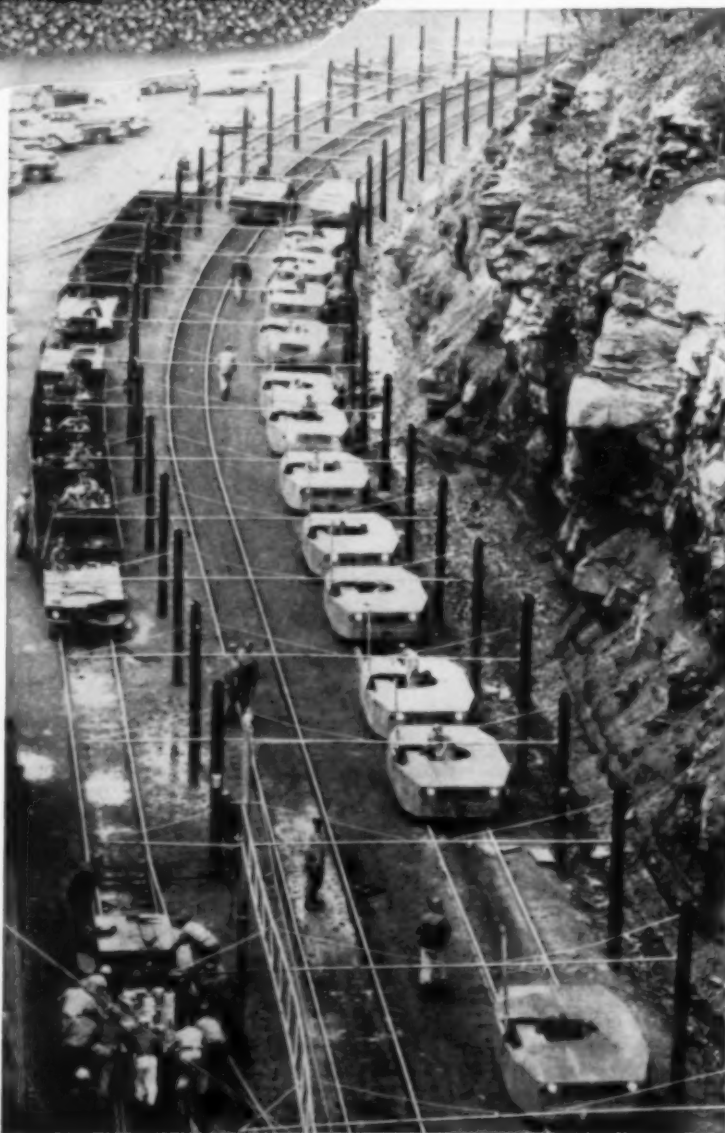
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Factual performance records prove that the Lee-Norse Mine Portal Bus can effect up to 50% savings in portal time . . . savings that result in more man hours at the section face . . . increased tonnage at a reduction in overall cost per ton.

Built in low and high types to suit your haulage road, the Mine Portal Bus features complete safety—two separate braking systems . . . split-roof design that allows operator full vision at all times.



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AIMÉ MEETING

specific gravity of the bath. The plant will produce steam and metallurgical coal at a rate of 450 tpd with only two operators in control of all cleaning equipment.

Coal Preparation at Humphrey No. 7 Mine, Victor Phillips, Christopher Coal Co.

A throughput of 20,000 tpd of coal from Pursglove No. 15 and Humphrey No. 7 mines is normal load of the new plant of Christopher Coal Co. at Osage, W. Va. Two 15-ft Chance cones and 48 wet tables prepare steam or metallurgical coal or a blended product. Also included in the fine-coal handling circuits are vacuum filters and 12 Reinvelt centrifuges. It has been found that screen life in the centrifuges can be substantially increased by selecting screens made of steel of slightly higher carbon content. Features of the new plant are silos for storing raw steam and metallurgical coal with provisions for blending, and a 5,500-ton concrete storage bin which was constructed by continuous-pouring methods. Hyslop screens, suspended from wire rope rather than boards and driven by an internal power unit, are used for sizing the coal. All major units are provided with ammeters at the control center to provide the operator with a continuous indication of the loads in various circuits and in individual machines. The result is closer control with minimum attendance.

Application of Mineral Dressing Fundamentals to the Solution of the Fine-Coal Problem, M. C. Chang and John Dasher, Crucible Steel Co. of America.

A change to trackless mining at Crucible mine, Crucible, Pa., created difficulties in the fine-coal circuits of the preparation plant. One of the most troublesome of these was a buildup of slimes in the circuit. Original practice at the plant had been to pass the slurry through 14- and 3-in Heyl & Patterson cyclones in parallel with a 75-ft Dorr thickener. Underflow of these units was filtered. Filter cake was added to the clean coal and filtrate and thickener overflow were recycled to the coarse-coal plant. The change in mining methods created the slime problem, with the further complication that there is no room for a waste pond to which the slimes might be pumped periodically from the thickener. The first step in solving the problem was to operate cyclones and thickener in series. The cyclones recovered the coarse particles and high-ash fines overflowed to the thickener where a flocculant was added to speed setting. Later a froth flotation circuit was installed to clean the underflow of the cyclones. The flotation prod-

uct is filtered and the reject is discharged into the thickener. Overflow of the thickener now is recirculated to the main plant without the troublemaking slimes. Thickener underflow is filtered. The cake is discharged into the refuse system and the filtrate is recycled. Total costs, capital and operating, of the flotation circuit (six Denver Sub-A cells) is about 14¢ per ton of clean filter cake. This product amounts to about 8% of the total product of the preparation plant.

Factors Affecting the Cleaning of Fine Coals by the Convertol Process, Shiou-Chuan Sun, Pennsylvania State University, and W. L. McMorris III, Columbia-Geneva Div., U. S. Steel Corp.

The authors reported on the laboratory application of the Convertol process in cleaning fine-coal samples from Robena, Alpheus and Corbin plants of the U. S. Steel Corp. Based upon the results of this research, it was concluded that:

1. Optimum pulp density ranges from 15 to 30% solids, depending upon the oil used. The laboratory unit consisted of a Waring Blender, in which it found that phase inversion could be accomplished in 1 or 2 min at a speed of 11,000 rpm.

2. Conditioning and retention are not required if the coal slurry is properly treated in the inversion stage.

3. Flotation is superior to Convertol, at least for cleaning slimes from the Robena and Corbin plants.

The paper also sets forth some rules-of-thumb for selecting oils.

Thermal Drying

Experience With the FluoSolids Fine-Coal Dryer, M. William Brandt, Dorr-Oliver, Inc.

FluoSolids dryer fulfills basic requirements for efficient drying, in that temperature of inlet gases is as high as possible, considering that fine coal is a heat-sensitive material, and exit gases leave the reactor at the lowest possible temperature at approximately 90% saturation. Temperature control of inlet gases is relatively easy to exercise because only a single thermocouple is needed in the drying atmosphere. Fluidized-bed drying is basically safe, because of the high relative humidity of the exit gases. It is in this exit stream that the finest sizes are carried to the cyclone collectors. The high water-vapor content makes it improbable that fires or explosions can occur. The first FluoSolids unit, at Lynnville Coal Co., Lynnville, Ind., dries steam coal at rates in excess of 100 tpd in sizes up to 1½ in. It was designed to handle 70 tpd of %x0 Bird filter cake. Drying temperature is 150 F and fuel consumption is 17.4 lb of coal per ton of feed (2-yr records). Power consumption of all associated equipment amounted to 338.3

kwh at 97¢ per hr. Operating costs when handling 80 to 85 tpd average 10.6¢ per ton, excluding maintenance and amortization. Half of this cost represents power and the other half is about evenly split between fuel and operating labor.

Fluidization—A Practical Approach to Thermal Drying of Fine Coal, J. P. Blair and Fred Coward Jr., Heyl & Patterson, Inc.

Moisture in coal reduces its heating value, increases freight costs and complicates unloading in cold weather. There are several types of thermal dryers, all designed to alleviate these problems, including screen, cascade, suspension and fluidized-bed units. The Heyl & Patterson dryer features a hearth of stainless-steel rods, above which the coal being dried is maintained in a fluidized bed. The advantages are minimum degradation and no internal moving parts. Capacity is 2 tpd per sq ft of hearth area for ½x0 coal. The unit can handle filter cake.

The Parry Dryer, R. J. Lofquist and James C. Wright, Silver Engineering Works.

The Parry dryer, designed by the late V. F. Parry, U. S. Bureau of Mines, is primarily intended for upgrading low-rank bituminous coal and lignite. The system does not employ a fluidized bed but accomplishes the drying by carrying the solids in the column of gases. A distinguishing feature of the dryer is that the hot gases are inert, containing not more than 4% oxygen. The system is operated under positive pressure to prevent intake of air. In treating lignite the dryer actually eliminates inherent moisture. In an installation at New Delhi, India, lignite at 60% moisture is dried to 6% final moisture. Fuel for producing the hot gases is taken from the dust collector associated with the dryer. In this country nine Parry dryers are in service at an Alcoa plant in Texas, a 100-tpd unit is operating at Wattis, Utah, and an installation is in process at Orient No. 3 mine, Freeman Coal Mining Co., Waltonville, Ill.

Personnel Selection

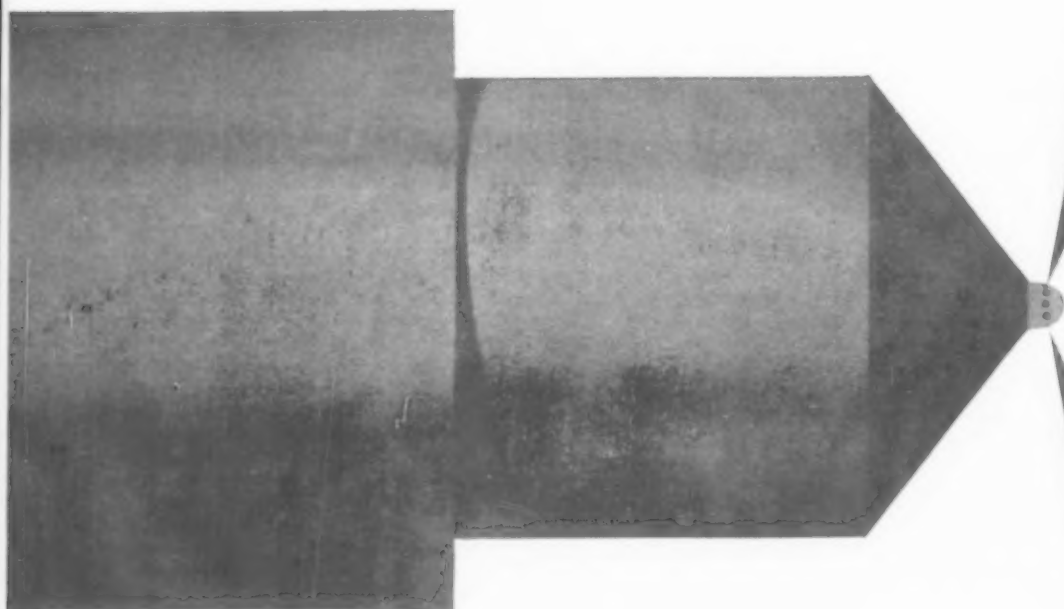
Coal Mine Personnel Selection, C. R. Nailler, president, Christopher Coal Co.

The chances of selecting successful supervisors at Christopher Coal Co. have been increased by the use of two psychological tests: the "California Short Form Test of Mental Maturity—Advanced Series" and the "Minnesota Multiphasic Personality Inventory" (Coal Age, September, 1957). In a testing program, on-the-job-rating was compared statistically with test scores. One of several conclusive results was that 75% of the top-ranked foremen and only 12½% of the bottom-ranked foreman

HOW

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can help you cut coal hauler engine maintenance



You get three big benefits with STANDARD Diesel Fuels. They mean less engine maintenance, extended time between overhauls, more in-service operation per hauler—and more profit on each ton of coal.

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AIME MEETING

scored at or above the standard on both tests.

Miners' testing programs are now based on (1) the "Revised Beta Examination," a simple intelligence test requiring no reading ability, (2) the "Bennett Test of Mechanical Comprehension," a test to determine the knowledge of mechanical situations, and (3) the use of a machine to test ability to coordinate the hands. Because of the wide variety of jobs and talents needed in modern coal mining, coal companies using these tests can not hope to acquire the validation that is possible with supervisory testing. Hanna Coal Co., however, has found that men selected by these tests are not only better than average employees, when compared with today's labor force, but are undoubtedly more trainable to meet the changes occurring in coal mine mechanization.

Psychological testing programs must be administered by trained people and accompanied by a sound personnel program.

Pitch Mining

Meeting the Challenge of Mining in Thirty-Degree Pitching Coal Seams, Albert M. Keenan, president and general manager, and Andrew Allan, superintendent, Thompson Creek Coal & Coke Corp.

Operating under extremely difficult mining conditions, Thompson Creek Coal & Coke Corp., Glenwood Springs, Colo., has developed a pitch-seam mining system that is so far safe and profitable. Features of the system include:

1. Blocking of coal into panels 400 ft up the pitch and 300 ft in length.
2. Installation of shaker conveyors in strike rooms.
3. Rock-tunnel penetration to new seam areas.

Pitch mining is now being applied to two mines producing 820 tpd of raw, high-grade, medium-volatile coals from seams averaging a pitch of 30 deg and having thicknesses of 84 in and 108 in. Output per man day is 5 to 6 tons.

One of the greatest challenges has been roof control. This is being successfully met through good engineering based on properly maintained mining sequences.

Deep-pitch seams have presented tough problems in secondary, gravity haulage. They have also obviated the use of mobile mining machines and shrink stoppage or induced-caving methods. Longwall mining is being considered for lower depths.

Industrial Engineering

The Application of Industrial Engi-

neering in Coal Mining, Charles W. Rountree Jr., director, industrial engineering, Island Creek Coal Co.

Industrial engineering boils down to providing the means for increasing productivity and reducing costs. Implementing a program involves time studies, the development of standards and the use of standard costs.

Time-study data can be used to improve methods, eliminate or reduce bottlenecks, provide a chronological picture of the operation of a section, determine work loads, develop standards and increase production.

Standards are an invaluable tool for determining what should be produced with a certain type of equipment under any conditions. They are especially important as a means for comparing actual and standard performance. Among other benefits, standards serve to point out weaknesses in methods, practices or supervision; they also provide a basis for determining standard cost.

The development of standard costs enables management to know, for example, (1) what cost a mine should be attaining, (2) what profit is available to the company through proper utilization of men, supplies and supervision, (3) what costs are out of line and (4) where changes in equipment and practices might be desirable.

AC Power

Benefits Which Can Derive from the Use of AC Power Underground, C. S. Conrad, division maintenance superintendent, Consolidation Coal Co. (W. Va.).

In pointing out the benefits of an underground AC distribution system, the author describes an actual system using 23 kv as the primary voltage with surface substations reducing the voltage to 4,160 for underground distribution. Utilization voltage is 440 nominal.

Benefits, in order of their relative values, are considered separately with emphasis on safety in eliminating mine fires, dust and gas ignition, and shock hazards to personnel. Improved lighting on face equipment and areas where lighting contributes to safety were also considered. Other outstanding features of an all AC system include improvement of machine performance and production continuity, and cost reductions in maintenance, equipment investment and power transmission. The benefits that an AC system offer are influencing designers to select AC power in proposed new operations.

Communication

Pioneering Carrier Current Communication and Control in Mines and Mills, W. P. Place, Femco Inc.

Development of a communication system that would meet the requirements of the mining industry presented a number of new problems that had to be solved before the present-day Trolleyphone was perfected. Among these were the high noise level of the DC power distribution system, the great variation in signal strength, heat, moisture, and mechanical vibration. Maintenance also was considered in the design to permit men with a minimum knowledge of electronics to service the sets.

Experience gained in the development of the Trolleyphone was later applied to remote control equipment which has been made available to the industry to control fans, substations and other equipment from a central control station.

Hoist vs Belt

A Comparison of Installation and Operating Costs of Automatic Skip Hoisting Versus Belt Slope for Deep Coal Seams, R. R. Richart, Freeman Coal Mining Corp.

Comparison of a vertical-lift hoisting method and the long slope-belt conveying system are made by describing actual installations of the Freeman Coal Mining Corp. The automatic skip hoist is equipped with a 1,000-hp motor and handles 900 tph with a lift of 480 ft. The 42-in slope belt uses a 1,500-hp motor, has a speed of 625 fpm and handles 1,200 tph of raw coal. Stepless acceleration of the 3,300-ft long, 16-deg single flight slope conveyor with a lift of 868 ft is achieved by using an eddy-current coupling to transfer the torque from the motor to the belt drive pulley.

Comparison of the power consumption of the two methods shows that the slope belt takes 60.8% as much as the shaft hoist. Construction and equipment cost of the shaft hoist was \$14,904 per 100 tons of hourly capacity per 100 ft of lift and the slope belt was \$12,856 per 100 tons of hourly capacity per 100 ft of lift. Labor and maintenance costs per five-day operating week showed a cost of \$350.00 for the shaft hoist and \$725.00 (excluding belt repairs) for the slope belt.

Safety

Safety Features in the Design and Development of Ireland Mine, George W. McCaa, general manager, Hanna Coal Co.

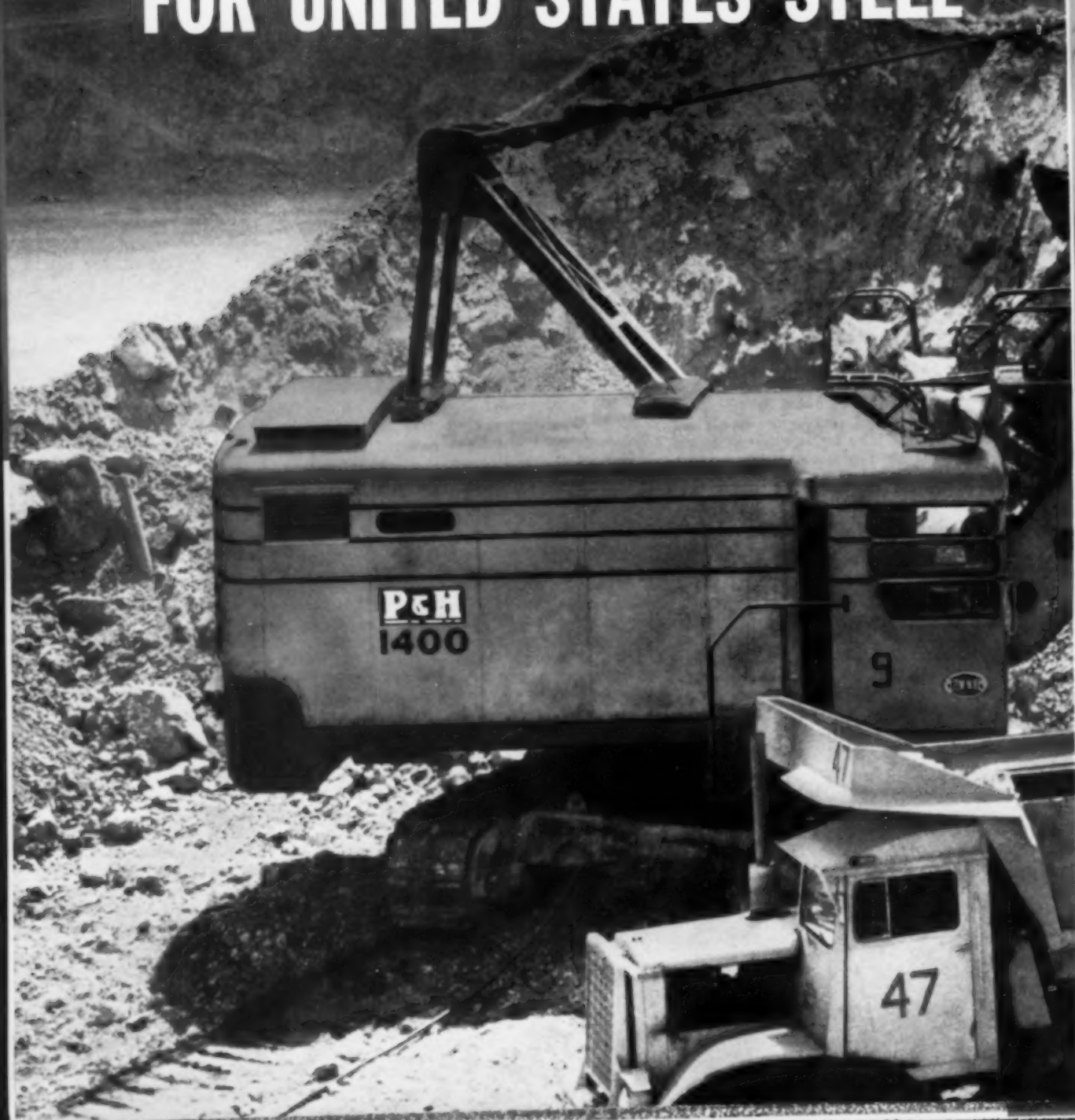
Design and development of the Ireland Mine (near Moundsville, Ohio) has aimed to make it the safest and most efficient mine possible. This objective has been brought within reach because the mine is completely new and has all new equipment.

Much emphasis has been placed on

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ELECTRICS ARE WORKING FOR UNITED STATES STEEL



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In their iron mining operations in southern Utah, United States Steel's Columbia Iron Mining Company is using *three* P&H 1400 Electrics. You will find P&H Electrics delivering dependable production in mining operations throughout the world.

P&H performance is the result of these exclusive P&H designed and manufactured features:

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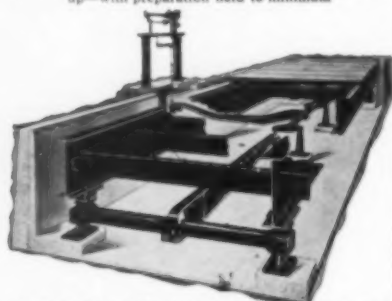
Construction and Mining Division
Milwaukee 46, Wisconsin

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AIME Meeting

protecting employees from falls of roof and rib in the working face area. One result of this effort was to equip ripper-type continuous miners with hydraulic roof-bolting equipment designed to replace hydraulic timber jacks. This permitted roof bolts to be installed ahead of the operator and within 13 ft of the working face.

Another result was to move hydraulic timber jacks about 2 ft ahead of the roof bolters and to install two No. 60 rails on the jacks as crossbars to protect roof bolters. This unit was put into operation with two bolts installed 8 ft apart through a 2 in x 8 in x 12 ft hardwood plank. These planks were installed on about 36 in centers.

At the start, crossbars and posts were also installed between planks. However, planks and bolts alone have proven adequate to support draw slate. Using this method, some 50,000 lineal feet of entries and crosscuts have been driven with only five small roof-falls, some of which can be attributed to improper installation.

Similar emphasis has been placed on roof control throughout the mine including main haulage roads and entries. Among other safety features:

1. All mining equipment, except for

the haulage, is operated with AC current which features distribution panels having ground trip devices that confine electrical failures to a single piece of equipment or cable.

2. The USBM conducted its 100% Accident Prevention Course and staff members have followed up with a continuing safety program which includes first aid and mine rescue classes.

Auxiliary Ventilation of Continuous Miner Places, R. W. Stahl, mining health and safety engineer, USBM (p 106).

Permissible Dust Counter for Use in Coal Mines, Sabert Oglesby, Southern Research Institute (Read by Alvin Bird, Southern Research Institute).

A new-type direct-reading permissible dust counter has been developed by the Southern Research Institute. A photometer-type unit, it includes a light source, light condenser, air inlet, air outlet, detector lenses and photo tube. Scattered light resulting from dust in the atmosphere is received by the photo tube as a pulse. The pulse is converted to a reading on a meter calibrated in particles per unit volume.

Advantages claimed for the unit include reading the concentration directly, ability to read sizes down to ½ micron or less, usefulness in higher ranges also so that comparisons with other methods can be made, and permissibility.

Roof Bolting in Kentucky Coal Mines, G. K. Martin, University of Kentucky.

Although the initial cost of roof bolting is slightly higher than conventional timbering in Kentucky mines, the increase in production and safer working conditions offset this disadvantage. With the experience gained in detecting doubtful roof in 6 yr of roof bolting, much has been done to prevent failures. Preventive steps include installing additional bolts or longer bolts, or by reinforcing the weak areas with timbering. The success of roof bolting in Kentucky is shown by the fatality rate for bolted mines—one fatality for 25,212,157 tons of coal—as compared to unbolted mines—one fatality for each 624,169 tons.

Handling Air from Conventional Coal Driers, Raymond Mancha and M. I. Dorfan, Joy Mfg. Co.

The Joy Microdyne dust collector is basically a wet mixed-flow unit that includes the following: (1) one or more spray nozzles; (2) an inertial mixing lattice for mixing dust and water; (3) stationary turning vanes for separating solids and liquid from air; (4) a second set of stationary vanes designed to reestablish axial air flow. Designed to remove extremely fine material from the exhaust gases from heat driers, the Microdyne is said to be very compact. It eliminates the expense of high-capacity water handling and is light in weight.

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CUTTING MACHINES



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THE TREND toward super power and super capacity in machinery calls for **SUPER RESISTORS** to keep breakdowns at a minimum.

The GUYAN design takes full advantage of the space available in the resistor compartment to build a resistor of proper electrical resistance and high current capacity. The terminals are of heavy cast bronze, clamp type for rigid connections. And they are easily accessible and plainly stamped corresponding to the terminal markings on the original wiring diagram.

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TWO BITS for cutting your costs...

Average cost of either style is only



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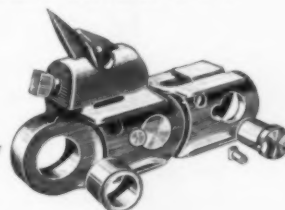
1. With this patented CONCAVE shape, side clearance is automatically maintained as the face wears away. This means uniform power consumption over the full life of the bit.

2. The HEAVY DIAMOND has a similar "stay-sharp" design feature, produces coarse cuttings. A rugged bit for severe conditions such as Iron Pyrites or Rock.



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TO TURN OR
REPLACE
WORN BITS IN
BOWDIL'S
"QUICK-CHANGE"
HOLDERS . . .



Any Bowdil Sales Engineer can help you establish the best style and temper for your need . . . and show you why

CUTTING

"THE LONGEST ~~DISTANCE~~ BETWEEN
TWO POINTS IS A BOWDIL BIT"

The BOWDIL Company
CANTON, OHIO

Plain Primacord Trunk Line. Is used also for shallow holes — wherever resistance to abrasion and cutting is not required. Textile covered, flexible, resilient, with a tacky non-slip surface. Tensile strength 125 lbs. — 1000 ft. spool weighs 18 lbs.

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The knot shown is the dove hitch made in the Plain Primacord trunk line and drawn tightly around the twin branch lines.



*All dressed up
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This Primacord hook-up could be one hole or a thousand, loaded and primed. But it's not ready to "go" until you attach the fuse and cap or electric blasting cap onto one end of your Primacord trunk line.

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and guard against *Stray Current* hazards



The square knot is used only above ground, to lengthen a trunk line of Plain or Reinforced Primacord, or to tie in Primacord M S Connectors. It must be drawn up tight.

F-4

MARCH, 1958

IVAN A. GIVEN, EDITOR

Results-Getter

MACHINES, big and little, along with carefully worked out methods and skilled men, are regarded as coal's major cost-cutting weapons—and rightly so. But there is another—most effective but so far little used in coal. It is a sheet of paper with figures on it—in other words, the "Operating Budget" or other equivalent name.

True cost control is difficult to obtain without such a budget, since without it there is no real standard against which to measure results. But if the expected tonnage for a week or a month is set down, and then the expenditures—labor, materials, power, etc.—which are necessary to obtain that tonnage are entered item by item, and a running record is kept day by day, the final step in cost control becomes an actuality. For maximum effectiveness, budgeting requires that operating methods, through time and methods study and otherwise, be brought up to snuff. Then budgeting really gets desirable results every time.

Still Room

A FULL YEAR of production without a single fatality was Colorado's contribution to the safety record of the coal industry in 1957. For this—and for the highest output per nonfatal injury since 1910—both coal men and safety officials in the state merit the respect and the admiration of the entire industry. Colorado's 1957 tonnage, incidentally, was 3,460,000. But the contributions of Colorado—and of other areas and organizations—still were not sufficient to move the bituminous industry ahead in 1957. In fact, as a result of an increase in the explosion toll, the industry actually lost ground, while anthracite barely held its own.

Safety results directly reflect effort, and any letdown is swiftly reflected in, at the best, a halt in progress and, at the worst, a definite loss of ground. Education, training and the elimination of hazards are of course critical elements,

but the most vital of the ingredients is constant, steady pressure. The records in Colorado and elsewhere show that the possibilities in the safety field are far from exhausted. Moral? More pressure in 1958, with falls of roof, face and rib, and haulage and explosions as special targets.

Shifting Patterns

CHANGES in costs, suitability and market demands have always been the major factors in shifts in the contributions of the various coal-producing areas to the total bituminous output. They are still at work and, as in the past, account for some major changes in fairly short periods of time. East of the Mississippi, for example, in the fifteen years from 1942 to 1957, the coal turned out by District 8 (southern high-volatile) has risen from 20.8 to 28.3% of the national bituminous output. Increases also have been marked up by District 3 (northern West Virginia), 4 (Ohio) and 9 (western Kentucky), with the result that the four accounted for 50.2% of the national output in 1957, against 37.4% in 1942. In contrast, modest declines were marked up for Districts 7 (southern low-volatile), 10 (Illinois), 11 (Indiana) and 13 (Alabama), while eastern and western Pennsylvania dropped one-quarter and one-third, respectively, in percentage of the national total.

Major factors in these shifts, aside from cost changes, include the growth in exports and electric power, and shifts in the areas producing metallurgical tonnage. These, plus general industry, will continue to set the production-territory pattern in the future. Even if large-scale production of synthetic gas and oil should come into the picture, the coal probably would be drawn from eastern fields since the big population and market is in that area. Pending the development of such new markets, the districts serving general industry and the electric utilities probably will tend to gain in comparison to those whose big outlets are steel and exports—especially in the next year or so.



EMPLOYEES: Winning their support will insure higher output and public favor.

Selling Your Company . . . and

With this new coal climate . . .

- Labor peace
- Progressive management
- An improved safety record
- Pleasanter living conditions
- Modern burning equipment

Expanded effort aimed at . . .

- Building public goodwill
- Putting employees on the team
- Cultivating the community
- Educating the customer
- Winning the investment public
- Selling industry progress

Can aid in meeting these needs . . .

- Higher quality personnel
- More capital
- Fairer legislative treatment
- Harder-hitting merchandising
- Better relations with allied industries and the general public

By W. A. Raleigh Jr.
Assistant Editor, *Coal Age*

SELLING YOUR COMPANY—and your industry as the composite of all companies—is one of coal's top jobs

in winning the promise of a bright future.

An exaggeration? No. As defined here, "selling" comprises all activities aimed at promoting harmonious relations with miners and other company personnel, customers, stockholders,

lending institutions, legislative bodies, allied industries, and the general public. In other words, all those groups where the attitudes of people can directly affect the welfare of a company and the conduct of its business.

Used in this sense, "selling" becomes the one common denominator which unifies the many components that enter into total company or industry growth. It becomes the one driving force in planning that recognizes that coal's future growth will not be automatic.

Thus, if the industry is to realize 600 million tons by 1960 and 800 to 1,000 million tons by 1975, a more aggressive, better-planned, more widespread effort must be made to win the confidence and enthusiasm of all the people who will make those tonnages possible.

For those who might question the need for this effort, consider seriously how you would answer such questions as the following:

1. Do you figure that you are getting the highest possible output and efficiency from your mine, supervisory and administrative personnel forces?

2. Has your company and industry established a working climate that naturally attracts new and replacement personnel from colleges, mining and vocational schools, and existing staff families?

3. Do your present customers understand price increases and shipping problems, and does your prestige



PUBLIC GROUPS: Key to gaining their acceptance—accentuate the positive

Your Industry

bring over-the-transom inquiries for new business?

4. When you need capital for modernizing or expanding properties, are lending institutions and the investment public already familiar with your company, its product and reputation?

5. Has the local community mind been pre-conditioned so that your long-range record of good performance is related to spot problems, such as, mine accidents, layoffs, stream pollution, etc.?

6. When legislative needs arise, do you find that municipal, state and federal officials respond understandingly to your company or industry story?

7. If a supplier, freight carrier or distributor is forced to a choice, does he rate your company as a preferred customer?

Unless you can given an unqualified "Yes" to all of the above questions, you have a "selling" job to do. An unqualified "Yes" to all, of course, is difficult. But it is not impossible when an industry and its company components adopt truly aggressive public and employee relations programs. Whether these programs are formal or informal, they should contain these basic elements for maximum effectiveness:

1. They should be continuous and long-range in concept.

2. They should recognize that each employee—from the man at the face and the telephone operator to the

salesman, department head and president—is part of the total effort.

3. They should be planned, coordinated efforts, directed by the president, a special assistant to the president, or outside public relations consultant.

4. They should have a constant flow of information through various communications media as the core of their activity.

5. They should have better mutual understanding between all internal and external "publics" as their persistent goal.

Enlightened coal management now has a golden opportunity to reevaluate and expand public and employee relations programs. The opportunity is golden because the time is ripe. On the one hand, the time is ripe because positive public relations effort is vital to fulfillment of coal's needs for quality personnel, more capital, fairer legislative treatment, and better relations with customers, allied industries and the general public.

On the other hand, the time is ripe because of the new coal climate which lends itself to positive public relations effort. The new climate features labor peace, progressive management, a much improved safety record, and pleasanter living conditions. Furthermore, the availability of a full line of automatic burning units has given coal new status as a modern fuel.



SPECIAL REPORT

To get a firsthand picture of where the industry stands in public and employee relations, *Coal Age* impaneled a group of 14 company, association and industry authorities who are doing outstanding jobs in this highly specialized field. They were asked to prepare statements based on their experience, and on their opinions about what can be done to improve present performance. These statements follow.

Building Public Goodwill

Coal has not been laggard in public relations activity but there are specific needs for strengthening the effort.

T. R. Berger, Ted Berger & Associates (public relations and advertising)

The coal industry has been public relations conscious probably more years than any other major American industry. This awareness was, to tell the truth, born more of necessity than choice. History has recorded adequately the trials of the industry, especially anthracite, at the turn of the century when the importance of cultivating favorable mass opinion was spotlighted by the aggressive unionization of mine operations and, later, by the inroads of competitive fuels. It's hard to find any group

which had to turn to "PR" in sheer self-defense as early in America's modern industrial history as the coal operators, particularly in the Pennsylvania hard coal region.

During recent years, the bituminous and the anthracite producers have undertaken successful public relations programs. Much of these programs was devoted to the task of correcting a distorted public image built up during years of strikes and labor-management strife, often publicized beyond the usual limits because of the powerful personalities involved and dramatic clashes which tended to obscure the real issues. Thus, the public relations goal of the coal industry consisted largely of lifting the stigma of past brawlings even while it was also doing an intelligent and enlightened job of pointing up the long-range economic worth of America's coal reserves and the modern applications of coal as a fuel.

For more than a decade, the writer has been associated in one way or another with public relations programs on behalf of major coal producers. My experience has concerned itself with dealing with various publics—union employees, supervisory personnel, stockholders, retail dealers, customers, the local community, etc. These programs knew what they wanted to accomplish. There was nothing vague or indefinite about them.

For example, one of our clients ran a half-page advertisement every week of the year to tell employees and the community at large about the company. Candid reports on earnings, productivity (or the lack thereof), accident records, improvements inside and outside the mines, and all sorts of other subjects were covered in easy-to-read, well-illustrated fashion.

News editors were provided with complete coverage of labor stories, serious mine accidents, personnel changes and happenings of general interest. Quarterly reports on earnings were mailed with a president's letter. Employees and business leaders were given an annual report, well illustrated. Special events such as first aid meets and an annual gathering of 50 yr employees were promoted.

While the community was being informed, so were retail dealers and the customers. Regular news letters were mailed to dealers, plus a magazine. A large-scale program of con-

sumer advertising, including radio, newspaper, yellow pages and outdoor, was conducted.

All these things are cited in order to emphasize that the coal producer has not been laggard in his attitude toward public relations.

Of late, the cooperation of the UMWA has bolstered the outstanding efforts of individual and industry-wide public relations campaigns. Unfortunately, this has not been in time to arrest the swing (notably in the domestic market) to rival fuels like oil and natural gas. But let it be said that even if the coal industry's efforts have not been completely successful in the home heating sales area, the fact remains that the industry has been trying.

Does public relations pay off? I believe it does indeed. Old Company's Lehigh anthracite, for example, has held its share of the hard coal market through all sorts of vicissitudes. I am convinced that it did so because a well-integrated public relations program created a high state of morale in the ranks of the Old Company sales force and a remarkable feeling of loyalty and confidence among Old Company dealers. Let it be said that the public can be trusted to give any firm an "A" for effort when it is convinced that the company is conscientiously doing its best to project a good light into the world around it.

Although both the bituminous and anthracite industries as a whole have been doing a creditable job of public relations, there are specific needs for strengthening the effort.

First, I believe the budget allowances to both the bituminous and the anthracite public relations campaigns should be increased to permit larger staffs and thus accomplish more promotional work. In the case of the Anthracite Information Bureau, for example, the staff as presently constituted is not sufficient in number to do a complete job. This group has a tremendous marketing area to cover and has been doing yeoman work for its size. It could do so much more, granted additional help.

Second, I believe that coal must throw off its old habits of conservative sales techniques in favor of an aggressive and hard-hitting merchandising program which should highlight these advantages:

1. Coal is safer.
2. Coal gives more heat for the money.

3. Coal is the most reliable fuel in time of war or national emergency.

4. Coal is as modern as any other fuel.

The latter point is especially important to underscore and points to an obvious shortcoming of solid fuel which has hurt it unmercifully in recent years. That shortcoming is failure to do the kind of promotion job for coal-burning furnaces and automatic-coal heat that oil and gas were able to do. Unless coal somehow, somewhere comes to the point where it can offer the homemaker a low-cost furnace with fully automatic features at a price below that of its competitors, it can never really hope to regain its one-time supremacy as a domestic fuel.

Industry public relations are currently near or at a new high. But there is still far to go.

**Rodney E. Sächs, President,
Boone County Coal Corp.**

Public Relations is such an all-encompassing subject that it is virtually impossible to define it in a few words or interpret it with a catch phrase. In effect, everything we are and everything we do determines our public relations. Even some of what we think and what we don't do are just as likely to affect it.

Many of us say that we cannot afford the luxury of a public relations program. Yet, whether we know it or not, we already have one, informal though it may be. We have no choice. Once we recognize this we have an opportunity to do something about it. We can influence whether our public relations are good or bad.

Coal industry public relations are currently near or at a new high. But there is still far to go. A renewed awareness by the great multitude of our operating and sales personnel of our importance and influence on the welfare and security of our country would be a big step in the right direction.

In the final analysis, we cannot have good public relations in the broadest sense unless we, at the same time, have even better private relations within our own industry.

Public relations by shell-and-pea magic is outmoded. Coal must be articulate . . . pursuing a reasoned and intelligent course with clearly defined goals and objectives.

Joseph E. Moody, President, Southern Coal Producers Association

The concept that public relations consists in hiring specialists who will, by shell-and-pea magic, create a favorable atmosphere is passing. Of course, all too many concerns and industries turn to so-called public relations to rescue them from the difficulty. That seldom works out, and never does unless the source of the problem is located and solved.

Increasingly, our industries are trying to operate in a way that can and should be talked about in the right places. We in the coal industry should pursue a reasoned and intelligent course aiming at clearly defined goals and objectives. Overall, we should seek to maintain and improve coal's position in the broad scheme of things.

First of all, to do this, coal must be articulate. Coal must speak for itself from the marketplace, in the halls of government. Coal must have its voice in the councils of the industries it serves, as well as the industries serving it.

On this premise, we should seek to maintain and improve communications with allied industries. We know, for example, that what happens to the railroads has got to affect us. Railroads are carriers of our commodity.

In similar fashion, what happens to the utilities of this country is of concern to us. They are our biggest customers. Here at least part of the problem is private industry vs socialized government power supply.

What happens in the oil industry is vital to us, be it by government edict or regulation or what happens by natural economic development. In Florida we are attempting to capitalize an internal economic development to coal's advantage.

What happens to the natural gas industry is of the greatest concern to us. As an example, we have the matter of natural gas entry into the Plains States.

These are but a few examples to

show why we should pursue a course based on the premise that nothing just happens. People make things happen. Our competitors, our friends, and our government all operate in recognition of that principle. We should proceed with equal conviction that coal is the best custodian of its destiny.

We still have a lot to learn about public relations. I think one vast area is industrial relations, the so-called relationship between management and employees. We have gone through a period of class warfare and a period of concentration of authority in the hands of a few labor leaders. The time has come for a change. My belief is that management and workers have common interests, that both will benefit by increased productivity and that, where possible, management should establish a relationship with labor which will enable them to work closely on mutual objectives.

An example of what can be accomplished in this field is the birth of American Coal Shipping, Inc., a coal-export venture jointly financed by coal producers, the UMWA and coal-carrying railroads. Many similar examples could be cited where common interest sparks winning team play even though the players have not been on the same lineup before. One of management's jobs as coach should be to see that these profit-winning combinations are put together more often.

Existing efforts are good but not adequate. Perhaps we should hire a public relations firm—experts whom we can hold accountable for definite achievements.

Bituminous Executive

I really don't believe that top management in most coal companies knows what a real public relations program is or can do for a company or an industry. I would like to see a "PR" expert included on the NCA and ASCA convention programs to discuss the whole topic. The speaker probably should not be from a firm because the listeners would feel that he had an ulterior motive. Denny

Griswold, publisher and editor of *Public Relations News*, is suggested as a speaker.

Insofar as NCA is concerned, I think Dr. Speare has done an excellent job in revising text books and reference books, and in setting up a speakers bureau. The series of ads on successful uses of coal and coal-burning equipment by various firms also is good. The work of the engineering department with government bureaus is good—good public relations is a by-product of this activity. BCI activities in contacting potential users, architects, contractors is good—public relations again is incidental.

It seems to me, however, that all these activities could be expanded greatly. Although we don't have as much money as the oil and gas industries to spend on PR, I don't believe we are spending enough or as much as we should, and neither are we as well organized. Perhaps we should hire a PR firm—experts whom we can hold accountable for definite achievements.

We had an excellent opportunity to try out in a limited area a comprehensive PR effort in connection with the Canadian gas case which is now up before the Federal Power Commission. Economics and politics will decide this case and a PR program aimed at informing people at the "grass roots" about the economics would generate political pressure. If we have a defensible case at all, and did a half decent job, I am convinced that a lot of the steam behind the gas industry's application could be condensed in favor of the coal industry.

Across-the-board, "grass-roots" public relations clears the way for the individual company to secure maximum benefits in the promotion and sale of its products.

J. E. Tobey, President, Appalachian Coals, Inc.

Public relations is a grass-roots job. The outline of its structure is a pyramid with a broad base and it must be built from the ground up and not from the top down.

If an industry wants favorable leg-

isolation, the seed must be sown among the home folk, the local press and other influential media. Federal and state legislators avidly read the papers and are stimulated by the climate created in their communities.

If an industry wants Wall-Street financing, it must build prestige on its home grounds and let it "seep" through to Wall Street.

If an industry wants more efficient production equipment, it must convince manufacturers that the need is great enough to justify their research and development costs.

If an industry wants to improve the utilization of its products, it must go to the grass roots and convince consumers of the economy of modern utilization methods and equipment.

If an essential industry needs a wider profit margin, it must convince consumers of the essentiality of its product to them and the long-range economy of paying the cost of production plus a reasonable profit.

To reach the objectives, all of the above items call for a mass approach in public relations on a cooperative-industry level. In addition, there are two other important phases of public relations which should be carried on simultaneously: inter-industry relations and the promotion by the individual company of its products to the buying public.

Inter-industry relations are at their best when the top executives of two complementing industries—for instance, electric utilities and coal—thoroughly understand each other's long-range economic and physical requirements and problems. Here, an exchange of basic information and exchange visits to become acquainted with each other's facilities and operations will do much to smooth the road which the two industries must travel together. Note: The coal industry is particularly weak in its inter-industry relations.

Finally, with the ground work laid and adequate programs established for broad public relations and inter-industry relations, the way is cleared for the individual company to secure maximum benefits in the promotion and sale of its own products.

In short, there are three important links in the public relations chain—overall public relations, inter-industry relations, and individual company relations. The three phases implement each other and none is strong without the other.

When the going gets tough, keeping people informed is more vital than ever.

L. L. Davis, Jr., Vice President, Gartley & Associates (financial public relations)

When times are bad, as they appear to be now, the value of a good public relations program looms increasingly large—more so, in fact, than when times are good. Reason: people seem to think best about companies and industries they know; therefore, the expert dissemination of certain news in a bear market does much to counteract the generally poor economic conditions that affect the company or industry covered by the news. Virtual silence, on the other hand, does just the opposite by tending to make people suspect, because they don't feel they "know" enough about what's happening. In short, bad times create a greater need for professional thinking in areas of mass communication.

Employees, investors, analysts, the press and the reading public can promote corporate welfare through adequate information on company activities, policies and objectives.

Anthracite Executive

Good public relations are of growing importance to anthracite producers. If a company would prosper, the local communities, customers and investors must be informed on many phases of its activity.

At the local level, an open-pit blast breaks some windows, a child falls into an abandoned pit, a house foundation cracks, an operation is shut down, refuse banks are cited as eyesores. These are samples of the type of thing that a good public relations program can counteract before the event is magnified to a disproportionate degree in the local press.

Customers need more information. Distortion of results has often caused consumers to shift to other fuels. Later, when the bills come in, the consumer realizes he has assumed a

fuel cost far greater than expected. An understanding is needed of the specifications of "standard" anthracite to avoid purchase of cheaper but higher ash fuel. A shear-pin breaks in an automatic stoker and the anthracite producer is blamed. Yet the cause of the break might be a bent nail that a householder's son tossed in the coal bin. Proper firing procedures are seldom employed. Failure to have the furnace and flues cleaned causes a fire. These are a few of the points on which the anthracite consumer needs some knowledge. A lack of understanding can make him a customer of some other fuel.

Employees, investors, analysts, the press and the reading public can promote corporate welfare through adequate information on company activities, policies and objectives. Many companies recognize the importance of informed employees and make regular contact through house publications or bulletins. Creative capital pays a premium in the market place for favorable corporate recognition and identification.

Internal relations, an important phase of public relations, begins with top management personnel. These individuals give identity and personality to a corporate entity. This initial expression of good public relations in a company must be carried on by all its salaried personnel. Recognition, not necessarily in the paycheck, freedom of expression, understanding and cooperation are a few of the factors that contribute to good internal relations. In turn, this salutary effect touches all employees and rubs off in their contacts throughout the community. The resultant attitude has great bearing on the ability of the company to prosper.

Putting Employees on the Team

More effective personnel management is critical to coal's future. An industry survey showed that quantitative and qualitative personnel needs are one of the five bottlenecks that must be broken to realize the potentials of the 1960 market (*Coal Age*, September, 1956, p 57). Essential to these needs are:

1. A working climate and incen-

tives which encourage maximum effort on the job.

2. Better recruiting and training of supervisory, engineering and mine force personnel.

In both cases, a vital ingredient for success is better communications between top management and their existing and prospective employees.

Much can be achieved toward an inspiring on-the-job climate if employees are kept adequately informed on salary policy, advancement opportunities, safety and welfare programs, etc.

Better communications play a key role in setting up and conducting training programs. A maximum number of employees will be encouraged to participate in training if objectives are clearly defined and publicized. Once underway, the success of a training course depends largely on competent instructors who are not only well versed in their subjects but also capable in the art of communication.

Some 200 scholarships in mining engineering are offered by coal companies and associations but many of these reportedly go unclaimed each year. Much could be done to alleviate this situation by more widespread publicity about the opportunities in the coal mining profession.

Among the most promising developments on the recruitment scene is increasing management recognition of the importance of interesting high school students in coal careers. One of the outstanding public relations jobs being done here is that of the Pocahontas Industrial Council for Education (*Coal Age*, November, 1957, p 54).

The following statements highlight what two companies are doing to maintain and strengthen employee relations programs.

All our endeavors stem from the philosophy of the "corporate citizen" which stresses responsibilities to employees and the community.

**David L. Francis, President,
Princess Elkhorn Coal Co.**

We have no formal public relations program or public relations director as such. Rather, our efforts in this

direction are originated by top management and implemented by the entire organization under my supervision. [Also see "Educating the Customer".]

All of our endeavors stem from a basic theory under which we operate and which we refer to as the philosophy of the "corporate citizen." In essence we feel that a corporation is more than a cold, efficient combination of talents and capital for the purpose of reaping profits. It is an entity with distinct responsibilities not only to its stockholders but also to its employees and its community, and we stress the latter two.

In company personnel relations, our goal is to provide for our employees the highest possible income and living standards in a climate of safe working conditions and wholesome and well-rounded living conditions. This, of course, is a two-way proposition and requires close cooperation between employer and employee. The best way to achieve this is through mutual understanding and a well informed labor group.

Because our organization is not large enough to warrant a regular house organ, we have developed the method of keeping our employees fully informed on matters of mutual interest through the medium of letters addressed to them over my signature. These letters follow no regular pattern or timetable and might cover literally any subject, such as a year-end progress report with plans for the future, organizational changes, equipment changes, Christmas greetings, oil imports, labor disputes, etc. We believe that these letters have been very instrumental in fostering harmonious relations over the years. We consistently lead the field in running time, and this could not be done without such relations.

In all mutual problems we attempt to draw out the employee, get his ideas and make him a part of the team. An example of this is the May, 1950 *Coal Age* article on our safety program.

To keep our employees well informed on a broader scope, we have for a number of years furnished them gratis continuing subscriptions to the weekly news magazine, *U. S. News & World Report*. It is difficult to gauge the intangible results of a program such as this, but we feel it has paid dividends.

[Company-sponsored programs ben-

efiting employees also include an extensive scholarship program, low-cost home financing, recreational facilities, church support and various youth training activities.]

By upgrading corporate-employee structure NACCO is in a favorable position to secure more talented people for future growth.

H. G. Schmidt, President, North American Coal Corp.

We believe that, public relation-wise, our best goodwill ambassadors should be our employees. Two conditions were required to fulfill our desire of up-grading our corporate-employee structure. The first—stability of operations—was achieved by our firm belief in signing long-term sales agreements. The second condition is the necessary growth pattern of the corporation within the industry [and important here is NACCO's Investor Relations Program—"Winning the Investment Public"].

We believe the productive efficiency of an individual should be rewarded with the maximum remuneration permitted consistent with job classification. At NACCO we have expanded during the last 4 yr to a point where 22 young college men have been employed in salaried positions. This influx of young talented people has generated an aggressive young organization. Pleasant surroundings were necessary and our properties have been modernized with consideration and thought given to eye appeal. The opportunity for advancement is facilitated by offering free tuition for courses completed from approved institutions of learning.

In the spring of 1956, a forward-looking plan was initiated to bring capable, trained young men into the company. Four scholarships a year are offered to high school graduates. We also placed under contract freshmen, sophomores, juniors, and seniors at selected universities. Reaction to this program has been so outstanding that in the spring of 1957 over 300 young men applied for our awards.

To encourage a desire to continue

with our firm, we have recently improved our profit-sharing, retirement pension, and insurance benefits. We now believe that NACCO is in a favorable position to secure more talented people for our future growth.

Cultivating the Community

The local community evaluates a company, in the first instance, by the way it treats its employees. Well-conceived, employee-relations programs, such as those featured in the previous section, recognize this fact. As put by North American Coal: "Our best goodwill ambassadors should be our employees." This "grass-roots" approach becomes a natural springboard for contributing to civic welfare and for becoming, in fact, a responsible and fully accepted part of the community.

Acceptance by the local community then provides a natural springboard to good standing with the public on state, national and international levels. An outstanding example of how this can happen is shown by the experience of Hanna Coal Co. highlighted in the second company statement below.

A company's standing with the local community can easily be jeopardized by spot problems or disasters, for example, mine accidents, layoffs, stream pollution, etc. The community mind has a natural tendency to magnify such events out of proportion to a company's long-range record of good performance. Much of this tendency can be controlled if that record has been adequately publicized to pre-condition the community mind.

Even at best, however, the spot problem or disaster is the acid test for maintaining public favor. The following statement shows how Pitt-Consol is now successfully meeting such a test in the Pittsburgh, Pa. area.

Handling of a serious local community problem ... What ... Why ... How ... Results.

**Joseph W. Oliver, Vice President,
Pittsburgh Consolidation
Coal Co.**

The problem concerns the protection of residential homes against damage from mine subsidence. It also involves the need for understanding among homeowners and communities of the difficulties posed by the rapid postwar suburban home-building developments in the company's mining areas.

The current phase of the problem won wide public attention in the Pittsburgh area early in 1957 because a number of homes were damaged by surface disturbance resulting from mine subsidence. There followed protests by a rapidly-formed, homeowners protective association which variously sought to prevent continuance of the company's mining operations in certain areas, to have the coal condemned and contributed to the surface owners, to win blanket coal support from the company for a token price, etc.

The problem itself was not new; it was the increased emphasis and urgency of certain factors which focused greater attention on it. For many years, the Pittsburgh Coal Co.—the only company division operating in heavily populated areas—carried out a policy of making available to homeowners coal support at a reasonable price as a means of preventing possible surface damage resulting from mine subsidence. Over the years, several hundred homeowners have availed themselves of this policy, and so far as we know, none of these homes has suffered any structural damage from mine-caused surface subsidence.

With the great increase in suburban housing development, however, it became clear to us that a broadened approach to the problem was necessary—both with respect to reviewing our general policy and to a more effective articulation of our objectives.

As a result, we have undertaken a coordinated program aimed at coping with the problem of mine subsidence within the framework of the company's public relations policy. The objectives of this program might be stated as follows:

1. To educate present and prospective homeowners on the cause, effect, and prevention of mine subsidence.

2. To re-affirm the vital importance of coal to the economic health of the community, and thus to show

the community's stake in a solution to the problem.

3. To state clearly the company's economic interest and stake in the areas affected by the problem, and to create a realistic understanding of the limitations to action which these conditions impose.

4. To attempt to show that factors (2) and (3) logically point to the conclusion that the best solution to the mine subsidence problem is to plan home construction in mined-out or unaffected areas.

5. To win the support and cooperation of those groups and agencies who are largely responsible for the selection, financing, and construction of homes and home sites.

6. To offer all possible assistance to homeowners faced with a mine subsidence problem, as a means of eliminating personal concern or possible financial hardship.

7. To maintain a flow of information on the problem to newspaper, radio, and television news media in the area as a means of helping insure a complete and fair coverage of mine subsidence.

To achieve the objectives of this program, we have taken these specific actions:

1. Pittsburgh Coal Co. has agreed with individual owners of existing homes, who purchase coal support beneath their dwellings, that the company will pay for any structural damage to their homes caused by surface subsidence resulting from mining beneath their dwellings. Moreover, where the purchase of support involves a cash outlay that may cause hardship on the homeowner, the company will cooperate in arranging for the payments to be made over a period of years.

2. A brochure was prepared entitled, "The Cause, Effect and Prevention of Subsidence." It illustrates the actual physical phenomenon of subsidence in understandable language; outlines past and present company policy in the matter; and seeks to show that the best interests of the community will be served if future home construction is planned for mined-out or unaffected areas. The brochure was distributed to company employees, state legislators, real estate brokers, lending institutions, and colleges and libraries in the affected areas. In addition, it is available upon request to any home-

owner—present or prospective—who wants an understanding of mine subsidence.

3. A set of maps was prepared showing past, present and future mining operations of Pittsburgh Coal Co.; and making clear the areas where damage from mine subsidence might be expected to take place. These maps were made available to the Federal Housing Administration in Pittsburgh, the Allegheny County Planning Commission, the Home Builders Association, the Veterans Administration, the Regional Industrial Development Corp. and others. We believe that these maps fill a vital need among builders and planners for the proper selection and recommendation of home sites. All groups have shown a willingness to collaborate.

4. Both through meetings with newspaper editors and by means of news releases, all phases of the problem and the company's actions are being communicated. Coverage has been generally fair and complete.

5. Personal and amicable contact has been maintained with protest groups and their representatives. Discussion of mutual problems has been frank and open. In one instance, a tour of Pittsburgh Coal Co. mining properties was arranged so that members of the group could study the problem at first hand.

6. As in the past, ample advance notification is given to homeowners when mining operations are contemplated under their dwellings. Written notification is generally followed by a personal visit by company engineers, who provide a full explanation of the contemplated operations and advise the homeowner on the recommended course of action.

It is too early, of course, to appraise the success of this program. We realize, in addition, that complete satisfaction of all parties involved in a mine subsidence problem is probably not attainable. Nonetheless, we already have some indications that we are on the right track. The active interest of financing and building groups in seeking subsidence-free development areas has been most encouraging. There has been a substantial reduction in the number of complaints about subsidence, as well as an increase in the number of coal-support purchases by homeowners in affected areas. And we have reason to believe that

the company's position in this difficult matter is now better understood and more objectively appraised.

Plant tours have brought much favorable local, national and international publicity.

James G. Ault, Manager, Industrial Relations, Hanna Coal Co.

For many years Hanna Coal Co. has permitted visits to its properties by interested individuals and groups. Public interest in visiting our properties began to develop in the early 1930s when our first mechanical coal washery went into operation and when we began the mechanization of the loading operation in our mines. For several years this interest was pretty well confined to local service groups, who expressed an interest in seeing a "coal laundry" and in seeing a machine in operation which could load as much coal in a shift as several men could manually.

Subsequent to those early days, visitation rapidly grew far beyond local service groups. It now also includes many visitors from schools, colleges, engineering societies, and from the coal and other industries. In more recent years, the highlight of underground visitation was an automatic passenger elevator installed at one of our mines. Visits to this mine received much favorable local and national publicity.

Since the advent of our large stripping equipment, the emphasis on plant tours has shifted away from underground mines. Visitors are now primarily interested in seeing our 46- and 65-cu yd shovels, our large haulage equipment, the Georgetown preparation plant, and the work we are doing in reclaiming land affected by open-cut mining. We still have, of course, occasional groups of visitors who have some particular interest in seeing our underground mining.

Plant tours are conducted on a very informal basis. Ordinarily, conducted tours are only arranged for groups who contact us in advance. In such cases, these groups are shown whatever phase of our operations they desire to see.

The biggest group was composed of some 175 members of an engineering society—some of whom were accompanied by their wives. Service groups have come from as far as

130 mi away. On one occasion, a group of Eagle Scouts visited from near Toronto, Canada. They were met by local Eagle Scouts and were given a joint tour of our properties.

We also frequently have visitors from foreign countries who are sent for visits with unions and company officials. We believe that these visits, in addition to acquainting foreign visitors with American mining methods, also give them a good insight into the high place which the American working man occupies in our society. The visits also help to spread into the free countries of the world something of our American philosophy of free enterprise, good labor-management relations, etc. I think it is not an exaggeration to say that we have had visitors from practically every free country in the world.

Handling hordes of tourists posed a serious safety and traffic problem if we permitted them to drive their cars up into the shovel pit. We, therefore, arranged to keep the spoil bank near the shovel-operating site leveled with adequate roads. In this way, tourists may drive up to watch the big shovel in operation from a safe vantage point. We have signs directing them to a point where they can observe the shovel and we have prepared a pictorial brochure for each visitor. This presents pictures and descriptive information on the shovel, haulage trucks, preparation plant, and reclamation and beef cattle program.

To accommodate visitors, we have a man stationed during the daylight hours in the spoil bank area where they visit. This man explains the operation of the shovel, answers questions and hands out the brochure. On returning home, many tourists tell their friends and relatives about what they have seen and we receive many requests for additional copies of the pictorial brochure, all of which we honor. We also get additional tourists the next summer!

Our land reclamation program has proved to be of great interest to all visitors and especially to many groups of soil conservationists, farm groups, and others who are interested in the problem of land use and productivity. Many people in these groups have been prejudiced against open-cut mining and it is refreshing to note that even the most bitter critics leave in a different frame of mind.

(Continued on p 82)

In conducting tours for groups interested in reclamation, we do not hesitate to tell the whole story on reclamation. We proceed on the basis that there is nothing whatsoever to be ashamed of or to hide. We are proud to show the work that has been done to date in putting the stripped land into productive use. We are also proud to inform visitors of planned experiments to further improve this land.

Educating the Customer

The three main product-marketing jobs ahead are:

1. Keep existing customers from switching to competitive fuels.
2. Convert as many competitive-fuel customers as possible to coal and modern coal-burning equipment.
3. Develop new customers through developing new uses for coal.

On all three levels, coal is making significant progress in customer education. Especially notable in connection with (1) and (2) are the programs of Appalachian Coals, Inc.; the Bituminous Coal Institute, the American Coal Sales Association, and, in the case of anthracite, the Anthracite Information Bureau. In connection with (3), the cause is certain to benefit the BCR's plan to build a major research center for bituminous in Pittsburgh.

Each of these organizations, however, would be the first to admit the need for wider understanding and support of their tasks. In effect, this means more individual companies should undertake their share of regional and industry-wide efforts to spread the story of modern coal.

Also on the public relations agenda is the ticklish job of getting customers to accept the need for price rises stemming from wage boosts and the higher cost of supplies. Without this understanding, coal stands to lose out on earnings that can be retained for property expansion and modernization. In the extreme, product quality and customer services could be impaired and mining operations curtailed.

The way for modest price increases can be paved through telling the complete story of WHY. And telling

this story can still be made convincing if it is pegged to the industry's unique opportunity (as compared to competitive fuels) for holding prices down through increased labor productivity.

The three following statements outline aggressive customer relations efforts being made by a major coal company and two industry associations.

One of the most effective efforts has been flying customers in company airplanes for visits and inspections.

David L. Francis, President, Princess Elkhorn Coal Co.

In addition to close personal contact with our customers and prospects, we maintain contact with our customers and prospects through various media. One of the most effective has been flying customers in company airplanes for visits and inspections. This provides an excellent opportunity to cement harmonious relations between the customer and our mine and sales management staffs. Thus entertained, the customer is well-equipped to go back and tell the Princess-Powelson story to his customers, associates, etc. We make it a practice to hand out literature to all mine visitors.

Our manager of sales maintains regular contact with our 3,000 customers and prospects through monthly letters which cover a variety of subjects but which are designed to keep our story before the public.

We use a Cincinnati advertising agency to coordinate our direct advertising as well as all other aspects of our public relations program.

When addresses of industry-wide or national scope are delivered by myself or other top officials, we make it a point to get copies into the hands of our employees, customers, prospects, associates, etc., through the medium of direct mailings.

An educational film, "Life in a Coal-Mining Town" which was produced by Coronet Films, Inc., and filed at David, Ky., is made available through our sales representatives to any interested individuals throughout our entire marketing area.

[An article showing how astute customer relations have paid off for

Princess Coal Sales was featured in *Coal Age*, January, 1958, p 70.]

We are dedicated to orderly marketing through customer information.

J. E. Tobey, President, Appalachian Coals, Inc.

Going back to the beginning, when the Appalachian case was before the United States Supreme Court in 1933, among other things we promised to do broad-gage educational work among consumers, retailers, and other groups to promote the better utilization of coal; to systematically study the marketing and distribution of coal; to maintain an inspection and engineering department—the former to improve production quality and the latter to assist consumers in the better use of coal; and to maintain contacts with consumers to demonstrate the advantages of coal over competitive fuels. We have carried out these promises religiously. Following are some ACI activities:

The *ACI Bulletin* is a widely quoted weekly publication designed to create favorable impressions in public thinking about coal, increase factual knowledge and understanding of the industry's problems by its customers, and help clarify issues for both producers and sellers promoting the orderly marketing of agency coals.

ACI engineers have contributed innumerable papers to technical meetings and various technical magazines. ACI has written, printed, or reproduced several hundred pamphlets, technical papers and articles, of value to the coal industry and its customers.

Our registered professional engineers, over the years, have made literally thousands of individual plant fuel studies and engineering surveys of various coal-consuming industries, such as paper mills and electric utilities. Early in 1957, ACI made a complete engineering survey of all the investor-owned and public-owned utilities in the state of Florida in the interest of converting these utilities from competitive fuels to coal.

By Nov. 25, 1957, ACI had conducted 28 fuel engineering conferences throughout our principal marketing areas as an educational

get the picture?



BETHLEHEM STEEL



activity. These are on a professional level and acquaint industrial consumers with the latest and best methods and equipment for the most efficient coal utilization.

The 27th Fuel Engineering Conference was held in Detroit, Mich. at the Rackham Educational Memorial Building, in which nearly 1,000 industrial executives, engineers, and purchasing men participated.

The proceedings of these conferences are sent to a selected mailing list of about 2,000 people and bound volumes of the proceedings are to be found in libraries throughout the world.

Periodic insertions in trade publications throughout the year are utilized to convey the ACI message to prospects for ACI affiliation, to retailers and industrial users, and to potential customers for ACI coals.

Many booklets and pamphlets have been prepared and given wide distribution. Of these, *Stoker Etiquette* is a "best seller." This little-illustrated booklet, describing the proper adjustments and operations for small stokers, is in its 19th printing since 1941. More than 600,000 requests for this booklet have been received.

ACI companies this year will export more than 6,000,000 tons of coal throughout the free world. Our marketing men visit foreign countries study the market situation and render assistance in one form or another to foreign importers and users.

To more thoroughly familiarize the "professional" in the application of anthracite and its advantages.

Norman C. Curtin, Assistant Director, Anthracite Information Bureau

The future expansion of anthracite in the commercial space heating market is directly related to modernization of existing structures and to the growth of new commercial construction. These are areas in which anthracite can successfully fill a demand if there is sufficient education on these factors:

1. The increasing acceptability of improved automatic anthracite equipment by architects, property managers, government agencies, engineers and school boards.

2. The improved price position—compared with oil mixtures—which results from the anthracite sizes used in automatic equipment.

3. The continuing increased public interest in smoke abatement and air pollution control.

To further educate on the important factors in the commercial space heating field, one of our newest efforts is a Workshop Program. This has already worked successfully in such centers as Boston, Philadelphia, Newark, Allentown and New York.

At these workshops, AIB collaborates with state and local retail coal groups in providing data on commercial anthracite application to architects, engineers, school board members, school superintendents of buildings and grounds, smoke abatement officials and commercial-property-management men. Morning sessions, dealing with equipment and fuel utilization, are followed by an afternoon field trip to area installations. AIB will continue these meetings throughout the marketing area to more thoroughly familiarize the "professional" in the application of anthracite and its advantages.

A separate workshop for retail dealers and their staffs is made a part of the fuel conference in each metropolitan area. The program presents the simple story of: the advantages of commercial anthracite equipment, where it can be applied, and how the dealer can use the various sources of promotional assistance available to him.

New and remodeled public and parochial schools present a special problem. To acquaint these people with modern anthracite developments, these public relations activities are planned:

1. Displays of equipment and case history data of existing installations at state conventions of school officials.

2. Articles in state school association publications about anthracite equipment and its application to new and remodeled schools.

3. Special mailings to school board members of articles which have appeared in other journals.

4. A workshop program for diocesan and archdiocesan agencies charged with the responsibility of purchase and approval of fuel and equipment for parochial schools, churches, etc.

Federal and state governments are

large purchasers of space-heating fuels. In many areas, such as public housing and state education, money is provided to local authorities in the form of direct aid or operational subsidy. These agencies are being provided with AIB engineering services to improve utilization and efficiency. The services include education on factors of new installations and case history data.

[Other features of AIB's customer relations work are detailed in "Anthracite for Space Heating," *Coal Age*, April, 1957, p 55.]

Winning The Investment Public

The industry's need for investment capital, estimated at \$300 million annually during the next 10 yr, requires public support for both large and small companies. Present realization—averaging 50¢ per ton or less—is not adequate to accommodate this need from retained earnings alone. As put by Henry Schmidt, president, North American Coal Corp.:

"The industry, in my opinion, cannot possibly generate or retain in its business more than \$100 million per year . . . Therefore, about \$200 million annually or \$2 billion within the next 10 yr must be obtained externally [through long-term debt and equity capital]."

Whether a company finances expansion by public marketing of securities, or by borrowing from local lending institutions or insurance companies, it must be prepared to give a convincing story of its progressiveness and sound management. Being prepared means setting up and maintaining a continuous flow of information about aims, achievements, future planning, financial status, and contributions to the economic welfare of the community.

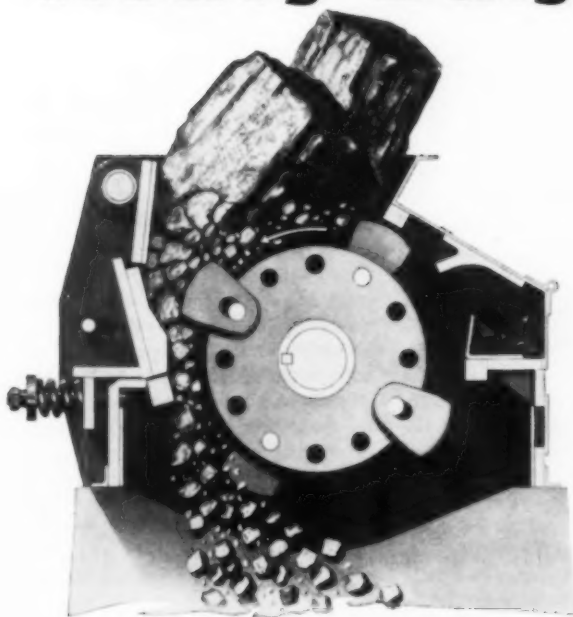
The first statement below—by an organization with substantial investment in bituminous securities—outlines the job coal must do to be well understood by the investment community. The second statement defines why a major coal company has undertaken a broad financial public relations program.

(Continued on p 86)

To keep mine refuse moving freely,



reduce it with a **JEFFREY**
Heavy Duty Slugger
CRUSHER



Among features which give ruggedness to this crusher are heavy-duty rotor with large diameter hammer pins, all-welded steel construction frame and heavy renewable manganese liners.

THE Jeffrey Heavy Duty Slugger Crusher reduces large rocks and refuse from full seam mining to a size that can be readily handled on a belt conveyor. The resultant sized product greatly decreases the possibility of spontaneous combustion at the dump.

This crusher is, in effect, a high-speed single roll unit, although the crushing is done entirely by impact. Hammers weighing 100 to 150 pounds each hit the rock and waste with sledge hammer blows. Feed ranging up to 54" square x 24" thick (in the 42" x 66" size crusher) can be reduced quickly to almost any sized product between 8" x 0" and 3" x 0".

For every coal crushing problem, write for Bulletin 784-C to assist you in selecting the proper machine. The Jeffrey Manufacturing Company, Columbus 16, Ohio.



CONVEYING • PROCESSING • MINING EQUIPMENT • TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

**Coal is not understood by
the investment community
... present market action
underscores misconceptions.**

**Robert E. Gibbons, Vice President,
Incorporated Investors**

In very broad terms it appears that the general investing public continues to regard the bituminous coal industry as one condemned to a future of continued attrition in its major markets. Apparently, many people still look on coal as a fuel primarily for railroad and home-heating use. They see oil and gas supreme in the home-heating market; all the trains that they ride on are powered by diesel locomotives. Thus, analyzing the industry on the basis of their own contact with it, they assume that its outlook must be bleak. Very few seem to appreciate the importance of the utility, metallurgical, and export markets to bituminous coal producers. However, the failure of the general investing public to appreciate the true position of bituminous coal today is of only secondary importance as the general public is usually not the first group of investors to properly appraise an industry's prospects.

Of more immediate significance is the question of the attitude of the professional elements in the investment business. It would appear that much more progress has been made in telling the coal story to professional investors, thanks to the efforts of the National Coal Association, a recent study by the Investment Bankers Association, and several studies by leading financial institutions. In fact, a year ago bituminous coal stocks were selling in the market at a quite generous multiple of earnings. Unfortunately, the industry has shown a slight lull in its resurgence which has apparently shaken the faith of many of the recent converts.

There seems to be a return to the idea that the bituminous coal industry is a declining industry which in 1955 and 1956 gave the illusion of a basic recovery which in reality was only a temporary cyclical bulge. Part of this disillusionment may have sprung from the overly optimistic estimates of 1957 coal production which were made in late 1956 and early 1957. Although coal production for the year 1957 will fall only a shade

behind the 1956 totals, the mildness of the drop is not generally recognized.

In this regard, I might suggest that the industry could do itself a service by pointing out that production in 1957 in this basic industry has declined less than in many other major industries. Also, although stocks of leading bituminous coal companies have declined far more than the prices of the average industrial company, the profit experience this year has been remarkably better than many other industry groups. Of the coal companies in which we have an investment, almost all are showing higher earnings this year than last. Such an earnings trend would not seem to justify the recent market action. In contrast the aluminum, paper, copper, and building materials companies, whose stock prices have declined to approximately the same extent as coal stock prices, have been showing very severe declines in earnings. The outlook for 1958 is for some attrition in earnings of the major coal producers, but here again, nothing of real significance.

In two other areas, there appears to be a good deal of misunderstanding which can only be blamed on the failure of the coal industry to present its story clearly and emphatically. I refer to labor efficiency and labor relations.

I doubt if more than a handful of the investment community recognizes that increases in labor productivity in the last 10 yr have been greater in the coal industry than in any other major basic industry. Apparently the picture of the coal miner armed with a pick and shovel, leading a mule, still persists. A simple chart in the *Wall Street Journal* and other business publications, showing the increase in output per man day in the coal industry with a comparative chart for industry in general, could be helpful in driving this point home. If few articles—possibly with color photographs of the amazing equipment now used in coal mines—could be inserted in such periodicals as *Life*, *The Saturday Evening Post*, etc., they could correct this misconception.

The other frequent criticism that we hear about coal stocks is the threat of John L. Lewis and the UMWA. With Lewis' partnership interest in the welfare of the coal industry through the Miners' Welfare Fund, he might be persuaded to set

forth his attitude regarding mechanization and the need for a decent return on capital for the coal companies. I'm sure that a comprehensive expression of the UMWA's objectives coming from Mr. Lewis would indicate that the bitter struggles of the past are unlikely to recur.

One final thought that bears on the whole subject of public relations in the coal industry can be summed up by the phrase "accentuate the positive." Too often positions taken by industry representatives on matters that affect the coal industry suggest that the industry thinks of itself as weak and in need of "handouts." The unfortunate conclusions of a recent House Interior Subcommittee report on the coal industry certainly did nothing to enhance the investing public's appraisal of the coal industry.

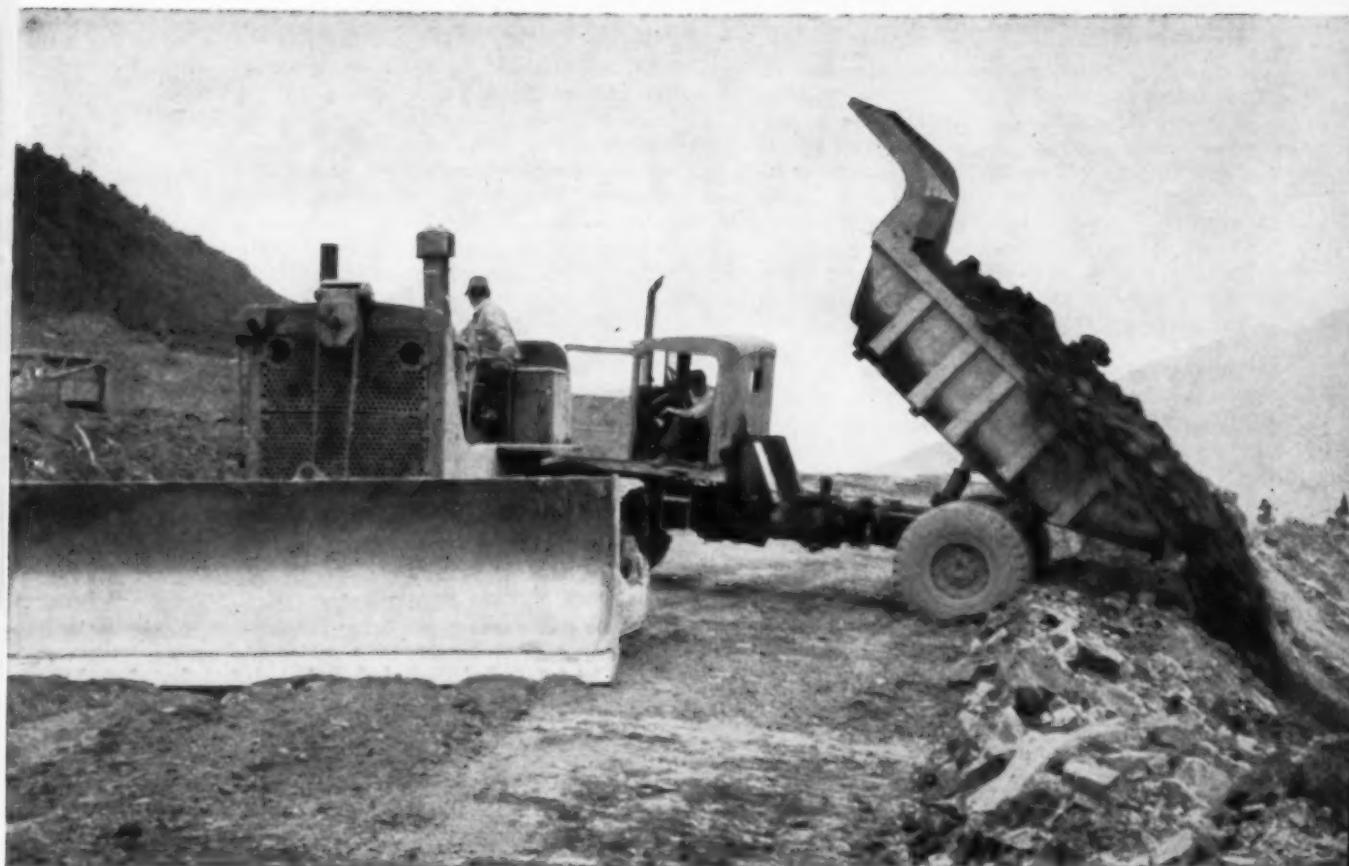
***The long-range objective
of our investor-relations program
is to facilitate the financial
support of the company's
growth.***

**H. G. Schmidt, President, North
American Coal Corp.**

A key public relations job at NACCO is "Investor Relations." We use the term "Investor Relations" [instead of stockholder relations] to broaden the definition to include professional investors as well as the individual shareowner.

Under private ownership, NACCO issued financial reports of the company. However, the principal owners were attuned to the corporate activities and the reports did not enjoy wide distribution. At the initial offering of North American shares to the public July, 1956, it was recognized that a corporate responsibility was the factual release of financial conditions, policies, practices and aspirations. To inspire confidence in NACCO, therefore, we have issued information to our shareholders and the financial community.

The long-range objectives of our program are to facilitate financial support of the company's growth and to create a favorable public relations climate. This is necessary for the orderly conduct of financial operations at fair rates. Another necessary



The dozers, trucks and shovels used at this strip mine in Alaska are made from High Strength Steel. They work all winter in sub-zero weather and even in the summer must dig through permanently frozen ground.

High Strength Steel rips through rock at 30 degrees below zero!

Edwards, Nesmith, Ryder, Inc. operates a strip mine in Alaska. It's a hundred miles into the bush and it often takes a year to get heavy replacement parts there. But they haven't had a shutdown since they started in 1953. Why? Their shovels, dozers and trucks are made from High Strength Steel.

Says President and Business Manager Wesley Edwards, "Our equipment has to work every month of the year, and we dig ground that's frozen solid a foot below the surface even in summer. During the winter we have an extra problem—the temperature goes down to 30 degrees below zero. When it's that cold and you have to rip through this sandstone and bone seam, you can crack steel blades pretty easily.

"But, we've had no trouble at all with our equipment made of High Strength Steel. It has actually cut through a mountain of ice and rock to open the sixty-foot vein we're working now."

High Strength Steel handled this job because it's stronger and tougher than structural carbon steel which is still being used in some earthmoving equipment. High Strength Steel has a yield point 50% higher than that of structural carbon steel and it has more resistance to wear, impact,

abrasion and atmospheric corrosion.

United States Steel produces three brands of High Strength Steel—COR-TEN Steel, MAN-TEN Steel and TRI-TEN Steel. Each has a specific combination of characteristics that is best for certain jobs.

For more information, write: United States Steel, 525 William Penn Place, Pittsburgh 30, Pa., or contact our District Sales Office.

USS, COR-TEN, MAN-TEN, and TRI-TEN are registered trademarks of United States Steel

United States Steel

objective is to maintain shareowner support of management.

Our investor-relations program is concerned only with the long term. Long-range planning requires favorable investor opinion of the company. Our effort is justified because the company is sound, progressive and capable of staying in business as a profitable operation. Our performance under the long-term program will determine investor opinion. It is our sincere effort to keep the investors correctly informed. We believe this will assist us in providing financial support for growth when justified.

Selling Industry Progress

During the last 3 yr or so, probably more has been achieved in selling industry progress than during any similar length of time in coal's history. There is still, however, a major job to be done in correcting public misconceptions stemming from stigmas of the past.

The time for selling the modern industry could hardly be riper than now. Coal has achieved a new look which lends itself to positive public relations effort. The new look features labor peace, progressive management, a much improved safety record and pleasanter living conditions. Furthermore, the availability of a full line of automatic burning units has given coal new status as a modern fuel.

At its annual meeting last June, the NCA public relations committee recognized the need for expanding industry public relations efforts. The committee recommended a program dedicated to cultivating a favorable attitude toward coal through informing the public about:

1. Coal's importance to the Nation as a source of fuel, power, light and chemicals.
2. Miners, their wages, working and living conditions.
3. The progressiveness and efficiency of the industry and forward-looking philosophy of its management.
4. The advantages of coal when used with modern equipment.

Especially vital to coal is the need for selling industry progress to federal, state and municipal government officials. Unfortunate in numerous

approaches to these officials has been the tendency to portray coal as a "sick industry." One such case, for example, was cited previously in this article by R. E. Gibbons, vice president, Incorporated Investors: "The unfortunate conclusions of a recent House Interior Subcommittee report on the coal industry [proposed federal coal research program] certainly did nothing to enhance the investing public's appraisal of the coal industry."

A more likely payoff: Give government officials the straight facts and base coal's legislative needs on the industry's progress and basic importance to the Nation's economy.

The following statement outlines bituminous coal's present industry public relations program.

To present facts about the coal industry in a manner that will be interesting, informative and beneficial to the public and to the industry.

Rex M. Chaney, Director of Public Relations, National Coal Association

NCA's Public Relations Department is assigned the responsibility of developing and carrying out a public relations program for the entire bituminous coal industry. The aim of this program is to present the facts about the coal industry in a manner that will be interesting, informative and beneficial to the public and to the industry.

To attain its public relations objectives, NCA begins its program "at home." All employees are impressed with the principle that every individual who earns a livelihood through coal should be an ambassador of good will for the industry. Service to member companies is, of course, a paramount consideration. Through its weekly *Industry Bulletin* and other periodicals, NCA's Public Relations Department keeps coal executives throughout the country closely advised on matters of interest to the industry.

To broadcast the coal story, no medium of communication is overlooked. Special publications, such as the monthly *Current Coal Trends* and the annual *Steam-Electric Plant Factors*, are made available to sup-

pliers, consumers, and transportation executives. Biannually, the department publishes a book of industry facts for the use of editors and educators as well as interested parties within coal and associated fields.

Perhaps the finest set of photographs of bituminous coal operations ever assembled is on file for use of newspapers, magazines, advertisers, and educators. The color movie, "Powering America's Progress," has been shown on television stations more than 200 times and prints are in continual use in schools, service clubs, and at other meetings in all parts of the country.

As often as news value justifies, releases and feature articles are prepared for wire services, newspapers, magazines, individual writers, and radio and TV commentators. The releases may refer to statements made by coal industry spokesmen, to statistics developed by NCA's Department of Economics, or to any of a number of industry problems which may need to be put before the public.

The Public Relations Department's educational division reaches hundreds of thousands of fertile young minds each school year through distribution of teaching aids. Advertisements in faculty magazines inviting teacher inquiries to NCA produce 50,000 to 75,000 information requests annually. A new series of advertisements to be instituted in early 1958 will encourage high school students to embark on careers in mining engineering. Material to follow up the advertisements is ready for distribution.

The NCA Speakers' Bureau stands ready to provide a speaker on any appropriate occasion. Periodically, Rotary, Kiwanis, Civitan, Lions and other clubs are invited to schedule an address on the coal industry or on a relevant subject. NCA, which is equipped to provide the material for the talks, acts as a clearing house in scheduling speakers.

Because so many of coal's problems are directly attributable to government policies, it is necessary that the department at all times work in close liaison with members of Congress and officials in executive departments of the federal government. Much of the time of the department staff is consumed in the preparation of material bearing on legislation in which the coal industry has a direct interest.

EXTRA **EXTRA**

BBC

BALANCED BELT CONSTRUCTION

PLUS

New DULON Covers

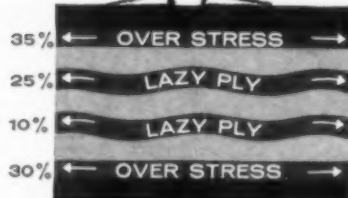
PROLONG BELT LIFE!

BBC - Balanced Belt Construction — is BOSTON'S exclusive manufacturing method that equalizes ply stress so that each ply pulls its full share of the load . . . eliminates lazy plies.

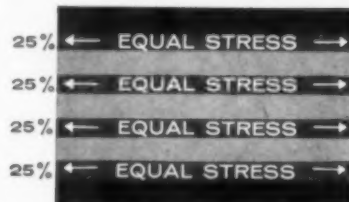
This is the result of two advanced BOSTON processes; *Electro-Tensile Control*, which controls ply tension — and *Rotocure*, the only continuous method of vulcanization which assures uniformity throughout the belt.

New DULON Covers add further uniformity and durability to BOSTON belts. With DULON, the consistency of belt performance has been greatly increased. DULON has proven, on the job, that it is amazingly resistant to abrasion, gouging and tearing.

Let the BOSTON man present the dramatic proof about Balanced Belt Construction with DULON Covers — as it applies to your specific belt problems.



CONVENTIONAL BELT CONSTRUCTION



BBC-BALANCED BELT CONSTRUCTION

BOSTON

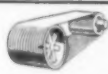
BOSTON WOVEN HOSE & RUBBER COMPANY
DIV. OF AMERICAN WILTYRE RUBBER CO., INC.
BOSTON 3, MASS.



INDUSTRIAL HOSE



BELTING



V-BELTS



PACKING



MATTING



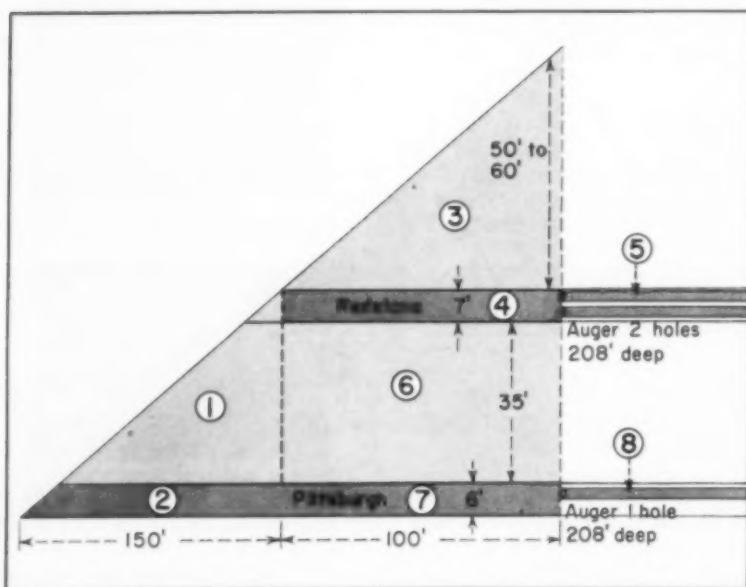
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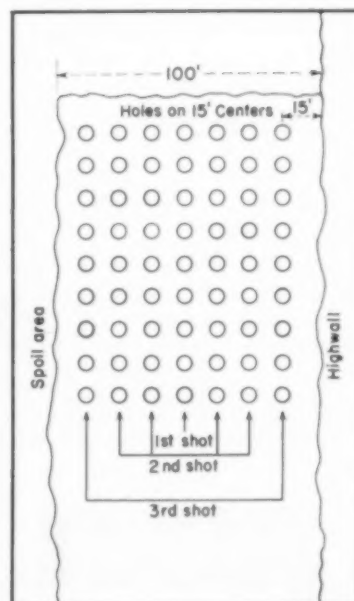
STRIPPING AND AUGERING two seams of coal are shown above. The auger (right) is mining coal from the Redstone seam while the 8-yd walking drag line (left) is removing overburden from the Pittsburgh seam.

Eight-Step Contour Mining

How equipment growth and an eight-step system for stripping and augering two seams of coal increases tonnage and makes available more mining territory.



EIGHT-STEP contour mining is shown by the numbers: (1) remove overburden from the Pittsburgh seam; (2) load the Pittsburgh; (3) remove overburden from the Redstone seam; (4) load the Redstone; (5) auger the Redstone; (6) remove overburden for second pass in Pittsburgh; (7) load Pittsburgh; (8) auger Pittsburgh.



DRILLING PATTERN and firing sequence results in better fragmentation and reduces vibration and noise.



WALKING DRAGLINE was purchased to make second pass in Pittsburgh seam. This was necessary because overburden had to be cast over old spoil bank.



VERTICAL DRILL sinks blastholes for second pass in Pittsburgh seam.

at Petitto Pits

AN EIGHT-STEP SYSTEM for stripping and augering two seams of coal developed by Petitto Bros., Clarksburg, W. Va., calls for well planned methods and proper equipment to remove up to 95 ft of overburden to recover an average of 13 ft of coal.

The Petitto Bros. property is near the Clarksburg headquarters in northern West Virginia. It contains two seams of coal: the Redstone with an average height of 7 ft and the 6-ft-thick Pittsburgh. They occur near the top of the mountain. The Pittsburgh seam is 35 ft below the Redstone and out-crops approximately 150 ft ahead of it.

Stripping operations started in 1943 and the first step was removing overburden over the Pittsburgh seam. Equipment used consisted of a Manitowoc 3500 with high-lift boom and a 2-yd dipper and a Lorain 75 shovel with a capacity of 1½ yd for loading coal into seven 1½-ton dump trucks. Other equipment included two Caterpillar RD7 and one International TD14 tractors.

Mining Operations

The eight-step Petitto system set

up to strip and auger is as follows:

1. Remove overburden from the Pittsburgh seam back to the Redstone.
2. Load the Pittsburgh coal.
3. Remove overburden from the Redstone seam.
4. Load the Redstone coal.
5. Auger the Redstone seam.
6. Remove overburden for the second pass in the Pittsburgh seam.
7. Load the Pittsburgh coal.
8. Auger the Pittsburgh seam.

Removing the first overburden over the Pittsburgh seam involved the use of bulldozers to push all loose material over the mountain side. After this was completed a horizontal drill was used to drill blastholes for the explosives. The remaining overburden was removed with the 2-yd shovel. Coal loading operations were carried out with the 1½-yd shovel and dump trucks.

This stripping operation was continued around the property until the first pass in the Pittsburgh seam was completed. Then all equipment was removed and put in operation on the Redstone seam. Stripping this seam

was carried out in much the same manner as the Pittsburgh seam. Loose overburden was pushed over the side into the Pittsburgh-seam pit, and the horizontal units drilled blastholes. Shovels transferred the remaining spoil into the Pittsburgh-seam pit, after which the Redstone was loaded.

The company, by this time, had obtained additional equipment to increase tonnage and add flexibility to the operation. This equipment was purchased over a period of years and includes five shovels, seven tractors and ten hauling units (see equipment chart for complete details).

In the followup stripping of the Redstone seam, an auger was placed in operation in 1952 to recover as much of the coal as possible. Due to the thickness of the seam it was possible to auger two holes, one on top of the other, to a depth of 208 ft each. A Compton Model 48 auger was used in this phase of the operation. Additional equipment and the ease of stripping this seam produced more and more augering territory. In 1953 another auger, a McCarthy Model 42 was purchased to keep pace with the operation.

The sixth step of the mining operation, which included making the second pass in the Pittsburgh seam, meant that the overburden would have to be cast over the spoil bank left by



What Electrical Connectors would you choose ...for these installations?

Modern mining techniques allow little time for coddling men or equipment . . . so it's a safe bet your answer to the question in our headline will be based on more than just the electrical requirements of the equipment. Such important considerations as safety, efficiency, durability and maintenance cost, will influence your selection. *This is as it should be and we're glad it's true . . .* for the mining industry's constant search for the best available equipment has made JOY Electrical Connectors their preferred choice since 1928.

Why settle for less . . . when the best costs less in the long run?

JOY plugs and receptacles are specifically designed to provide long-range, maintenance-free service under the most adverse operating conditions . . . and they're available in styles and sizes to meet every mining need. Two of the currently *most popular* designs for mining installations are illustrated at right. Equipped with non-corrosive metal couplings and flame-resistant Neoprene bodies, both are moisture-tight, shatter-proof and distortion-resistant.

Straight Pin Bigun (SPB)—Have threaded metal couplings. Plugs are factory-vulcanized to 36" cable leads or to lengths as specified. See Bulletin B39a for complete information.

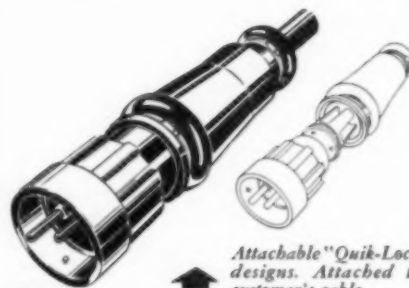
Attachable "Quik-Loc" styles—Attach quickly to customer's own cable. Newly designed couplings completely engage or disengage in ¼ turn. See Bulletin B57 for complete details.

JOY plugs and receptacles are available for both AC and DC applications. In addition, "SPB" and "Quik-Loc" connectors may be supplied with pilot control contacts for *permissible operation* when used in conjunction with JOY'S Bureau of Mines-Approved distribution centers (SCC units). Ask us for complete information, *Joy Manufacturing Company, Electrical Products Division, 1201 Macklind Ave., St. Louis 10, Mo.* Executive Offices: Henry W. Oliver Building, Pittsburgh, Pa.



Molded-to-cable "SPB" designs. Have threaded couplings.

Ask for Bulletin B39a.



Attachable "Quik-Loc" designs. Attached to customer's cable.

Ask for Bulletin B57.

W&J CDS447

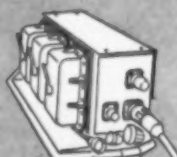


Consolidated Joy Engineers

JOY

SPECIALISTS IN CREATING ELECTRICAL CONNECTORS
FOR MINING AND INDUSTRY SINCE 1928

Write for information on these JOY products



Safety Circuit Centers



Distribution Boxes



Portable Lighting



New Cable Vulcanizer



AUGER UNITS, such as the one shown above, account for one-third of company's tonnage. Thickness of Redstone seam permits augering two holes, one on top the other, to a depth of 208 ft. One hole is augered 208 ft. deep in Pittsburgh seam.



GRADERS are used to clean the top of the coal before loading and also to help maintain roads for better transportation.



THREE-TRACK PREPARATION PLANT features a calcium chloride washer, a closed-circuit water system and a three stage electrical-control system.



PORTABLE WELDING UNIT facilitates on-the-job repairs on all equipment.



MAINTENANCE SHOP located near the stripping operation serves for major and minor repairs and for servicing. Three mechanics and two welders maintain equipment.

the other two stripping passes. To accomplish this, the company purchased an 8-yd Page walking drag line equipped with a 170-ft boom. Also, the natural bench left by stripping the Redstone seam meant that vertical drilling would have to be employed to drill blastholes. A Joy vertical drill was placed in operation in 1953.

Drilling and Blasting

Holes 6 $\frac{3}{4}$ in are drilled 15 ft from the highwall on 15-ft centers and approximately 33 ft deep. The drilling pattern calls for seven rows of holes along the width of the pass with each row containing nine holes.

As soon as a blasthole is completed

the blasters charge it with explosives. Each hole is charged with a primer and prilled ammonium nitrate fertilizer mixed with fuel oil. Approximately 100 lb of explosive is used in each hole, made up of a 20-lb primer and an 80-lb bag of ammonium nitrate. When holes contain water, the primer is placed in a waterproof container before it is placed in the hole. Dry cuttings from the drill are used for stemming.

Instantaneous caps are used in the center row and delay caps in the remaining six rows. The delays permit the explosives to work more efficiently and to break the overburden better. They also reduce vibration and noise, thus eliminating complaints from surrounding home owners.

Through extensive experiments conducted by the blasters, it was proven that better fragmentation resulted by first setting off the center row then the next two rows on each

"Less maintenance problems with BUCYRUS-ERIES... less downtime, more pay hours for me!"

— says 22-B operator at Iowa mine



"I've had experience with Bucyrus-Eries and several other makes," says Wayne Zeck, Knoxville, Iowa, who operates a 22-B coal loading shovel for Beard Coal Company. "I've found that you have far less maintenance problems with Bucyrus-Eries. That means less downtime and more pay hours for me."

MORE OUTPUT, too, for Owner, Byron Beard

"Bucyrus-Eries prove as good as you expect them to," states the veteran strip miner whose Flagler mine has been in operation since 1934. His 22-B, equipped with $1\frac{1}{2}$ -cu. yd. coal loading dipper, loads coal during an $8\frac{1}{2}$ -hr. shift. "Engineering-wise, this 22-B is a swell machine. I like the machinery layout, and I especially like the power system for its long life with little maintenance!"

You can enjoy the same low upkeep, high output pit operation. With a Bucyrus-Erie 22-B shovel, you get more working time each hour of every shift — more daily output — because:

It stays on the job. It's built tough. Quality materials provide strength, durability, all-weather stamina. Parts are simple, large, few



in number — there is little that can go wrong. Machinery is arranged simply, compactly so that maintenance can be handled quickly with little downtime. It's easy to keep a Bucyrus-Erie going at top speed. Exceptional synchronization of speeds and power assures smooth, well balanced work cycles . . . fast, responsive controls.

Stop in and chat with your nearby Bucyrus-Erie distributor. He'll gladly give you the complete story on the popular 22-B, or any other model — ranging from $\frac{3}{4}$ to 4 cubic yards.

544E58

A Familiar Sign . . . **BUCYRUS-ERIE** . . . at Scenes of Progress

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

side of the center and the two outside rows last. During experiments with blasting it was found that if the two outside rows were set off first, fragmentation was very poor. This was attributed to the fact that the type of material in the spoil bank, along with the length of time it had been there, resulted in its not giving enough to permit the other shots to be very effective.

Loading and Hauling

Before the coal is loaded it is cleaned with a power shovel and a grader. The primary purposes in using the shovel are to remove large quantities of dirt from the coal bed and to prepare the highwall for augering. This includes taking down all loose material above the coal and moving it to the spoil bank.

Upon completion of the cleaning process a Lorain 38B shovel with a 1¾-yd capacity loads the coal into seven 15-ton Mack trucks which haul the coal to the preparation plant. The average haulage distance is 3 mi with a maximum of 5. Roads are maintained by bulldozers and graders.

The company owns a rock crushing plant to provide rock for use on the roads. The benefits of this plant are realized in better maintenance of the roads which in turn reduces truck maintenance and speeds up truck haulage.

Preparation

The preparation plant features Belknap calcium chloride washer. Coal is discharged into a storage bin at ground level. It is then conveyed to the extreme top of the plant and discharged onto a 2-in bar screen. All 2-in plus goes over the picking table and into the primary crusher. This coal is then reunited with the 2-in minus from the 2-in bar screen on the top strand of the raw coal conveyor. It is then discharged onto two 5x8 double-deck vibrators screening at ½-in. The ½-in plus is discharged onto a drag conveyor and the ½-in minus goes to the bottom strand of the raw-coal conveyor. The drag conveyor discharges the ½-in plus to a new 120-in Belknap washer. After dewatering on an Allis-Chalmers screen the coal can flow in either of two directions: one, it can be carried by a drag conveyor to a secondary crusher, reduced to

Petitto's Tonnage and Equipment Growth

Year	Tonnage	Original Equipment List
1943	80,000	1 Manitowoc 3500, 2-yd dipper 1 Lorain 75, 1¼-yd dipper 7 1½-ton dump trucks 2 Caterpillar RD7 tractors 1 International TD14 tractor
		Equipment Added
1944	82,000	1 Caterpillar D8 tractor
1945	87,000	2 Euclid 15-ton trucks 1 Manitowoc 3500, 2 yd dipper 1 Caterpillar D7 tractor 1 Portable truck welder 1 Portable compressor
1947	90,000	1 Lorain L820, 1¼-yd dipper 1 Caterpillar tractor 1 Euclid 15-ton truck
1948	96,000	3 Euclid 15-ton trucks 1 Caterpillar D8 tractor 1 Erie 22B, ¾-yd dipper 1 Lorain 41, ¾-yd dipper
1950	110,000	1 Erie 38B, 1½-yd dipper 1 Caterpillar 12 grader 4 GMC 620 trucks 3 Caterpillar D8 tractors
1952	125,000	1 Compton 48 auger
1953	140,000	1 Joy vertical overburden drill 1 McCarthy 42 auger
1955	145,000	1 Page 625 drag, 8-yd bucket 5 Mack 630 15-ton trucks
1956	200,000	2 Mack 630 15-ton trucks 4 International TD24 tractors

slack size and reunited with the ½-in minus on the bottom strand of the raw-coal conveyor for loading into railroad cars on either of three tracks; two, it can bypass the secondary crusher and be fed onto a twin shaker screen where four sizes can be made.

The plant features a closed-circuit water system to eliminate wasting calcium chloride and to prevent stream pollution.

Noteworthy is the foolproof electrical control system incorporated in the plant. The system is set up in three stages and interlocked. The failure of any one stage will stop the equipment of the other two stages, thus stopping the flow of coal to prevent pileups.

Maintenance

The company employs five maintenance men; three welders and two mechanics. These men maintain all equipment owned by the company. A

field shop located near the stripping operation serves for major and minor repairs and for servicing equipment. The main shop is located at Clarksburg and includes all tools necessary to overhaul and rebuild equipment. When the field shop has more work than it can handle, equipment for overhaul is sent to the main shop.

Communication

The company uses General Electric two-way radios to communicate to all points. The transmitter is located at the main office, 15 mi away and is manned by W. J. Lacy, office manager. Supervisors' vehicles and all heavy hauling units are equipped with radios.

On the advantages of two-way radios on stripping operations, Tony Petitto puts it this way: "I could go on and on about the advantages received from these radios but to sum it up, I don't see how we could operate without them."

Company Background

When work first started in 1943 Petitto Bros. operated the mine for the Pardee & Curtain Lumber Co. After the initial stripping, they purchased the property and embarked on an expansion program leading to the present large-scale setup. From 1943 to 1957 output has increased from 80,000 to 200,000 tons per year. Strip mining yields two-thirds of this tonnage and augering one-third. The largest increase in tonnage has taken place in the past 2 yr. This increase has been credited to the purchase of the dragline, which has stepped up stripping and augering operations and made available more stripping territory. The drag moves up to 12,000 yd of overburden daily.

How the company grew equipment-wise is illustrated by the accompanying equipment purchase chart. It shows a direct relation between equipment purchases and increased tonnage per year.

The company is owned and operated by five brothers; Louis E., Robert S., Roger, Samuel and Tony Petitto. Antonio Petitto Sr., father, has been retired from the business for 20 yr. Each has a phase of the operation to manage but generally they work as a team helping one another as the need arises.

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For instance, materials developed for the missile program are used in parts such as valve stem oil seals. Oil filters are of the same type used in commercial aircraft. The traditional exhaust-heated intake manifold is replaced by a new water-jacketed induction system. Submerged-type electric fuel pumps virtually banish vapor lock. Head gaskets are of heat-resistant stainless steel. Two compression rings and the oil control ring are chrome-plated for

longer wear. A 50-amp. alternator replaces the generator as standard equipment.

These are but a few of the many advancements you'll find in Ford's thoroughly tested all-truck Super Duty V-8's for 1958. Tested in dynamometer laboratories, tested on the proving grounds, tested in commercial fleets from coast to coast... these new Ford V-8's, products of over six years of engineering development, are now ready to serve you.

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NEW! Three all-new engines—401 cu. in. V-8 develops 226 hp., 350 lbs.-ft. torque... 477 cu. in. V-8 develops 260 hp., 430 lbs.-ft. torque... 534 cu. in. V-8 develops 277 hp., 490 lbs.-ft. torque.

NEW! Water-jacketed induction system contributes to maximum power output with excellent economy by providing more positive temperature control of fuel-air mixtures.

NEW! Fully machined combustion chambers and Turbulence-top pistons provide more accurate compression control and greater fuel-air turbulence, for top performance with regular grade fuel.

NEW! Submerged-type electric fuel pump virtually eliminates vapor lock. Pump delivers only solid fuel, always under pressure, operates independently of engine speed.

NEW! Valve seat inserts for intake as well as exhaust valves. Intake valves are hard-faced dished-type. Exhaust valves are sodium-cooled, faced with tungsten-cobalt.

NEW! Three-stage cooling system with separate temperature control for block and head, shortens engine warm-up time.

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LATCHES
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Cross-sectional view at right points out how flares extend over doors when closed, sealing material in car.



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to
1 1/2 TON
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CAPACITY**

If you were buying, for example, 16 bottom dumping cars of any other make with a 4-ton level full capacity, you would need only 14 S-D Automatics of the same overall dimensions to haul the same tonnage. You save two cars in every 16 . . . 12 1/2 percent in original investment . . . 12 1/2 percent in maintenance . . . 12 1/2 percent less dead weight to haul. Any one of our sales engineers will demonstrate to your complete satisfaction just how the construction features of Sanford-Day's exclusive bottom dumping car design give you this extra capacity. Assure yourself of the maximum economies bottom dumping cars offer you by buying S-D Automatics!



Now available in S-D Automatics only 32" high!

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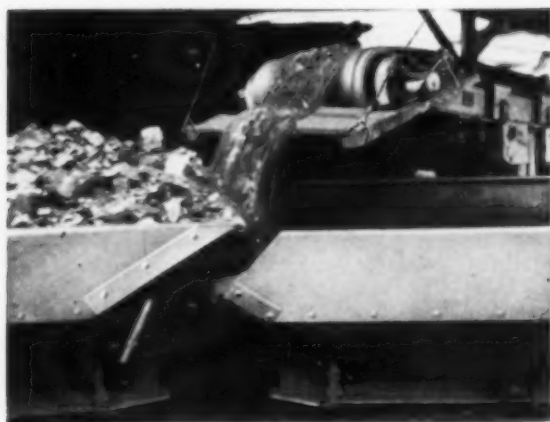
In addition to others and the S-D "Automatic" illustrated, we recently manufactured and shipped to a Kentucky mining company the same design car, but only 32" high, 6'8" in width, 19' center-to-center of couplers and having an inside body length of 16'. In addition to *overlapping ends*, you also obtain in S-D "Automatics," and only in S-D "Automatics": 1 —

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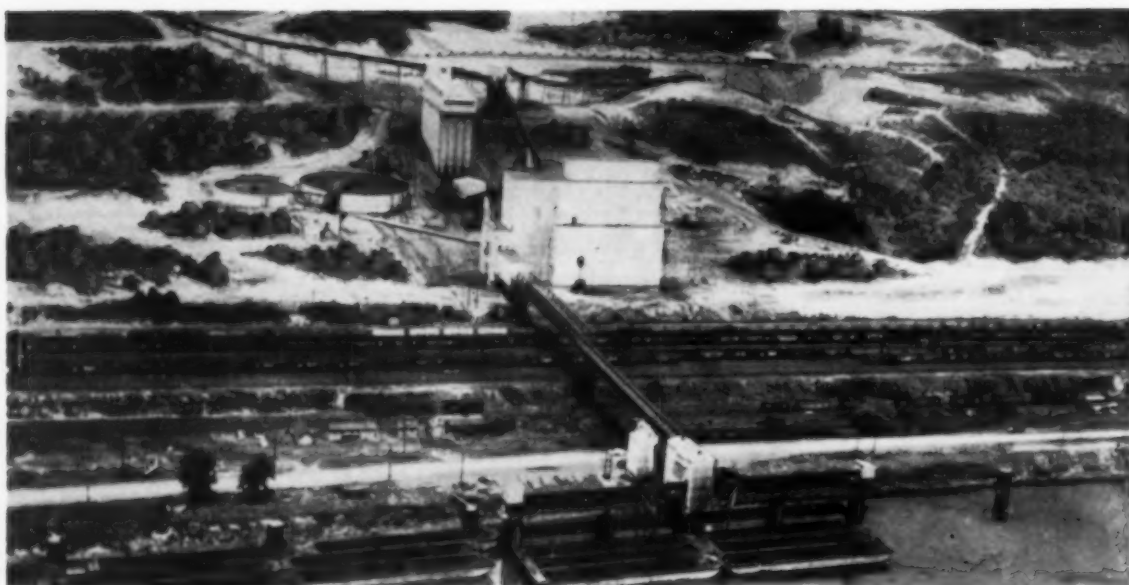
$\frac{1}{4}$ to $\frac{1}{2}$ ton more capacity per car for the same overall dimensions!

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pictured below is a trip of S-D "Automatics" with Overlapping Ends in actual operation. The car above (and further illustrated at right and left) is one recently ordered by a large company. It is 7' in width, 44" high, 20' center-to-center of couplers with an inside body length of 16½ feet. It further features spring mounted trucks and automatic couplers.



SANFORD-DAY
Knoxville, Tennessee



Good Preparation Design

Preparation Goals

Provisions for Changes

Refuse Disposal

Plant Water

Loading Facilities

Raw-Coal Storage

Washing Limits

Structural Details

Equipment Details

Interchangeability

Power Supply

Plant Painting

By F. R. Zachar

Consulting Engineer, Christopher Coal Co., Osage, W. Va.

CONSIDERATION of details is important in arriving at a satisfactory design of a preparation plant. It has long been almost standard practice to begin making plant changes almost before the first ton of coal has been processed. This is costly and unnecessary, and such revisions can be eliminated or greatly reduced if proper attention is paid to design details.

In many cases those responsible for plant selection do not have time away from pressing operating duties to properly consider all of the fine points, but make only general decisions, leaving details completely in the hands of the contractor's engineers. All plants work and generally do the job for which they were intended, but the design of a plant that is as simple as possible, is the

easiest to operate and maintain, and which is as flexible as possible requires a great deal of painstaking scrutiny of details. This is by no means a condemnation of contractors' engineering—they will give their customer what he wants and what is best only if they are given opportunity to know his desires in detail.

It costs money to process coal and the coal producer should not be further burdened by pyramiding operating and maintenance costs through lack of attention, for whatever reason, to details in the design of his plant.

Consider Preparation Goals

Prior to any engineering consideration of plant details, the operating company considering construction must, above all, first determine precisely the plant's purpose and reason for being. This sounds elementary, but in many cases it is not given the full and exacting examination due a construction project which must per-

form satisfactorily for a number of years, and which may involve the expenditure of several millions of dollars. Preparation plants are built primarily to enable the producer to meet consumer requirements for the finished product, not to provide new and more complicated ways of doing things with coal and water. I like to keep in mind the advice of J. B. Morrow:

"The consumer is primarily interested in the most economic utilization of a fuel. This implies that it must be inherently suited to his particular use. The consumer can only afford to pay for a uniformly prepared product which produces tangible results, and the producer cannot profit on any part of his preparation that does not add to the realizable value of his products, nor can he expect to be compensated for uneconomical cleaning methods.

"Ultimately, then, the yardstick of the consumer is the most important factor, and the design and control of

Abstract of a paper before the 1957 convention, Coal Mining Institute of America.

the preparation plant should be mainly based on it, giving due consideration to the cost of the process as compared to the realization.

"The technology is secondary, although it will point the way to economically meeting the desired standards, and hence to an ultimate saving on the part of the consumer."

When the producer has determined the extent of his immediate preparation needs he might be well advised to outline to his engineers some idea as to what possible changes the future might bring. The plant washing only plus $\frac{3}{8}$ today might well be required to wash to zero in the future, and a plant using only mechanical drying methods might well be required to utilize thermal drying at a later date. Pre-design knowledge of possible future requirements will permit a design and plant layout that will better accept these additions if and when they become necessary.

Raw-coal characteristics with respect to size consist, percent moisture and washability are of obvious importance to plant design and equipment selection. Equally important are the qualities to be realized in the plant product. Necessary percent ash reduction, final product moisture and percent plant reject will influence selection of equipment and design capacities. When the decision is made as to what is to be done, and by what means these processes will be carried out, there are three basic questions to be answered about the preliminary design:

1. Is it as simple as possible?
2. Is it flexible and adaptable to change and addition?
3. Is its capacity as high as practical?

Examine Related Problems

While these are being given their due consideration, it would be well to analyze some of the major problems which, while apart from the plant itself, are definitely related to plant design. These problems are not necessarily presented in order of their importance here but must be carefully considered and properly handled to obtain best overall design.

Disposal of plant refuse must be thoroughly planned and, whether the refuse be transported by belt, truck, aerial tram or pipe line, there are

several questions that must be answered prior to project design:

1. Is the available disposal area large enough to permit disposal of all the refuse that will be produced during the life of the plant?

2. Do the selected site and transportation method lend themselves to economical suppression of gob fire?

Of course the economics of the entire refuse-disposal system must be given careful thought. It is important that refuse-handling costs be estimated on a cost-per-ton-of-refuse as well as on a cost-per-ton-of clean-coal basis.

Plant water requirements and available fresh-water supply are very important considerations in plant location. Not all operations are fortunate enough to be located along a river, and available water can often determine possible work days per year. For those mines using river water, it would be well to investigate the quality of the water by getting data on acidity and percent solids. Such data may dictate treatment to forestall undue maintenance.

Where the plant product is to be loaded on rail, the empty and loaded storage yards should be given at least preliminary planning time. Once the plant is definitely located, fixed clearances and minimum heights will usually fix track locations. It is entirely possible that a little preliminary investigation might save excess grading costs. The track layout itself should be tied in with the estimated percentage of coal to be loaded on each track, and switches, crossovers, etc., laid out to facilitate car handling.

If any or all of the plant product is to be loaded on river, necessary empty and loaded barge-storage areas should be determined, keeping in mind the possible maximum tons per day to be loaded. The river site itself may be fixed, but if at all possible docks should be upstream of major creeks or drains which may deposit silt in the dock area, causing dredging expense. The ideal dock site is one which has all mooring cells in line. This is quite often not possible, and dock layout should be given careful consideration to facilitate barge handling. Other points, such as number of different products that may be loaded, permissible storage width, maximum expected rise from normal pool, etc., are important to the design of loading facilities.

Another important point to be considered prior to plant design is the raw-coal storage or surge capacity needed, and whether or not these storage facilities need be blending facilities as well. Most preparation plants are expected to turn out a product of some uniformity and this may be rather difficult if raw-coal feed to the plant is not relatively uniform. It is nice to have a huge raw-coal storage capacity between the mine and the plant, but caution should be used in evaluating the economics of such expenditures.

There are also the problems of air and stream pollution to be reckoned with. These are usually peculiar to individual plant locations, but must be given just consideration in anticipation that antipollution requirements may or will become more strict, rather than more relaxed.

Study Washing Limits

Plant product requirements will usually dictate whether the plant washes only "coarse coal" or "washes to zero." The choice is not always open to the producer, but it should be remembered that capital and operating costs for minus $\frac{3}{8}$ coal are usually about three times those for the plus $\frac{3}{8}$ product.

If coal is to be washed to zero, the operator has the choice of doing it in a single unit or of screening raw and using separate devices for coarse and fine coals. Each system has its advantages. Those contemplating preparation plants are urged to give more than normal consideration to this point and to strive for flexibility.

Remembering Mr. Morrow's admonition, any process involving the wetting and drying of fine coal, and the consequent handling of resultant slurries, should be carefully scrutinized for adequacy and simplicity, with special emphasis on the latter.

In preparing a plant layout, there are three basic provisions around which all other functions must evolve. These are:

1. Raw coal must come in.
2. Clean coal must go out.
3. Plant refuse must go out.

Determination of general location of where these three things are to happen should be the first step in plant layout. If the processes for washing, dewatering, drying and necessary slurry handling have been de-

terminated to be adequate and as simple and practical as possible, the layout of equipment to carry out these processes can then be worked into the plant design, determining general overall dimensions. The following is a list of ten desirable features in a plant layout:

1. Simplified flow.
2. Flexibility of units and flow.
3. Minimum of units and interchangeability.
4. Gravity flow where possible.
5. Minimum of necessary connected horsepower.
6. Unit accessibility—no crowding.
7. Preplanned walkways and stairways.
8. Adequate hoistways and/or elevator in most advantageous location as practical.
9. Preplanned access roads and outside hoistways.
10. Preplanned supply room and shop areas.

Certainly there are items of importance other than these, but in general successful incorporation of these ten will go a long way toward arriving at a satisfactory layout.

Check Structural Details

The following briefly touches on some of the more prominent details of plant structural design. Space limitations prevent complete discussion of these details and consequently they are presented in outline.

FOUNDATIONS

1. Sub soil should be tested and the information used to determine bearing strength of general area. These tests will indicate grading costs or piling needs.
2. Plant storm, sanitary and emergency overflow drains should be incorporated in foundation planning.
3. Foundation design should be kept as simple as possible, avoiding haunches, complicated corners, wall-bearing beams, etc., as far as practical.
4. Before pouring, each column pad should be checked for area by impact soil test in excavated area. This eliminates assuming that soil bearing is up to designer's estimate.
5. All column foundations should be provided with grouted-in steel plate set by instrument. This will greatly help erection crews in setting plumb columns.

STEEL STRUCTURE

1. Structure should be designed for loadings with ample provision for adequacy of presently unoccupied areas when future loads are imposed.
2. The economics of bolting, as against riveting, should be looked into—with lower erection costs the goal.
3. Certain equipment induces structural vibration unless the original design provides for it.
4. The steel structure should be designed with erection ease in mind. Erection supervisors might well be given opportunity to review design and overall layout to better plan location of permanent cranes or stiff legs, and necessary booms on mobile cranes. Also, storage area for incoming steel and equipment, rail sidings, truck roads and other considerations so important to efficient erection should be reviewed prior to building.
5. While not a part of steel structure, plant floors must be considered during structure design. In layout work machinery is usually placed with relation to top of steel supporting floors. Concrete floors should be planned early in design to make sure that motor and machinery bases are of proper height. Floor drains should not be made the last item, but should be planned ahead so that concrete floor slopes and thicknesses can be properly determined. Also, where concrete floors are poured over a corrugated metal and mesh, it is quite costly to provide pipe and conduit openings after pouring. It certainly is a low-cost precaution to install sleeves at all columns so that if pipe or conduit needs to pass through the floor at any of these points only the corrugated metal need be cut. Generally, it is much better to have piping planned prior to floor design.

Consider Equipment

As with structural details, space does not permit a complete discussion of all of the various items of equipment that might be incorporated into a large modern preparation plant. We shall, therefore, outline only a few points with regard to several pieces of equipment that are used in almost all plants. The thinking is the same for other equipment and each unit should be given thorough attention.

SCREENS

1. Provide at least 50% excess screening capacity when selecting

dry raw-coal screening equipment.

2. Provide clearances for quick screen changes.
3. Provide room for future dust hoods on dry screens.
4. On feed troughs to dewatering screens provide fixed-screen launders ahead of screens.
5. Investigate other types before accepting high-cost shaker screens and necessary supporting members.
6. Carefully consider screen-cloth support and unsupported span widths.
7. Before selecting single-deck vibrating screens, check closely on the possibility of additional separation in the future. Double-deck frames equipped with single deck may be elected in many cases.

PUMPS

1. Where variation in pump discharge may be necessary, such as main sand pumps on Chance systems, provide variable-pitch drives.
2. Provide adequate-size pumps, but select drives so speed can be increased or decreased somewhat and still keep practical pump efficiencies and motor loads.
3. Provide adequate suction-line capacity and select suction line shut-off valves that are full-port opening.
4. Provide full-port discharge-line regulating valves, but try to select pump drive to eliminate necessity of discharge-line regulation.
5. Locate pumps with sufficient clearances to permit maintenance.
6. Provide a good gland-water system and protective devices.
7. Install ammeters at control panel to permit determination of pump performance at a glance.
8. Give proper consideration to percent and type of solids to be handled in individual pump selection.

BELT CONVEYORS

1. Belt conveyors should be sufficiently wide to permit practical increase of capacity by speed increase without motor and reducer overloads.
2. Conveyors should be duplicated as to component parts as much as possible, using design speeds to vary capacities.
3. Discharge pulleys should be kept over receiving hoppers in such a manner as to permit belt wiper products going with belt discharge.
4. Right-angle loading should be eliminated if possible.

5. Drip pans should be provided in initial design or at least room should be left for pans to protect equipment and walkways below.

6. Wound-rotor motors should be used on units requiring 100 hp or more, particularly where tensions under starting conditions need regulation.

7. Accessibility of grease fittings on idlers and pillow blocks should be provided in design.

8. Gravity take-ups should be eliminated where practical, but, where capacity or length may be increased in the future, care must be taken to provide for proper take-up.

DRAG CONVEYORS

1. These units are normally high-initial-cost and high-maintenance items, and should be eliminated where possible. Certain mixing and distribution conveyors must necessarily be drags, but in general chutes or belts are preferred.

2. Where drags are necessary the design should be carefully checked to assure easy replacement of flights, wear bars and bottom liners.

3. Instantaneous overload protection is a must.

FLUMES AND CHUTES

1. The duty of each chute in tons per year, as well as in tons per hour, should be considered in determining size and design of liner.

2. Right-angle turns are always objectionable and should be avoided.

3. Cover-plate requirements must be considered to avoid flume splash and leakage.

4. Liner material is very important and may vary from mild steel to stainless or ceramic tile or concrete, but should be given careful consideration.

Incorporate Interchangeability

It is always advantageous from a supply-handling and maintenance standpoint to incorporate as much unit interchangeability as possible into the plant design. This must be handled from a practical standpoint, but thorough investigation will often disclose many more possibilities than appear at first glance. In preparing preliminary specifications for design engineers, certain stipulations can guide their thinking and eliminate later design changes. The following

are only a very few of the writer's personal recommendations, and are presented herein only to make a point. Obviously there are many more:

1. All driven sprockets on roller-chain drives should be 60-tooth.

2. Minimum roller chain should be 120.

3. Motors of the same horsepower should have the same speed where possible, and should carry the same NEMA frame number.

4. Shafting and antifriction bearings can be held to only a few standard sizes.

5. Drag-conveyor chains, unless a conveyor is of extremely low capacity, should be made the same.

6. Pump interchangeability if given proper consideration, can often eliminate need for spares or excess spare parts.

Check Power Supply

In a large plant economics dictate bussing 2,200- or 4,160-V power to operating-voltage load centers near the motors served. A very careful study should be made of starting sequence and interlocking requirements, after which the individual motors can be relegated to load centers. In assigning motors to load centers no 500-kva load center should have as much as 500 connected horsepower assigned to it in the plant design, but rather each load center should have spare kva capacity for future installations not foreseeable in the design stage.

It is often quite economical to utilize high-voltage motors for some units. A good arbitrary rule is to use high voltage (2,200 or 4,160) for motors of 100 hp or more, and to use 440-V motors where less than 100 hp is required. However, each plant must be considered individually in determining these limits.

It is urgently recommended that all control equipment be acquired from one manufacturer. It leads to a more easily maintained control system.

As to wiring methods, the writer prefers to use multiple-conductor coded armored cable in expanded-metal raceways for control wiring, and single-conductor wire of proper size and insulation in rigid conduit for power distribution. There are many ideas on this, but the goal of

the designer should be providing the operating and maintenance organization with a wiring system that will be the easiest to trace and maintain.

The main transformer bank at the plant should have sufficient initial capacity to provide for future plant loads. No rule of thumb applies, but 5,000 kva should be provided for a plant with 4,000 connected horsepower.

Grounding circuits should be given advance consideration and mats installed prior to final grading. It might be considered good practice to frame-ground all motors above 440 V to an independent grounding circuit, rather than ground to structure.

Plant lighting is very important and deserves considerable thought in its planning. It is urgently recommended that a thorough study be made of initial and operating costs of fluorescent vs incandescent before selection is made. Lighting circuits should be planned and it quite often is most convenient to locate distribution panels at the head of stairs. Idle-time circuits can be incorporated quite reasonably with assured savings.

Include Painting

While painting is sometimes a forgotten item, or one taken for granted, it is really quite important. Proper painting specifications incorporated into the design can save untold dollars in future maintenance. Practically all structural steel is delivered to the job site as "red iron" and has a primer paint coat applied. Painting specifications calling for cleaning and priming all surfaces damaged in erection and in riveting or welding are found in too few erection contracts. Oversight would seem to be the only reason for this omission.

In determining the processes to be used, the equipment to be utilized, and the overall plant design, the operator usually has a certain capital cost figure that cannot be exceeded and still stay within the economics of the project. Any plant contractor will furnish a rough estimate of plant cost expressed as dollars per-ton per-hour and these figures should be looked at carefully before embarking on design. Only the operator is in position to evaluate these preliminary estimated costs and to be aware of what benefits he will receive dollar-wise by processing his coal as he has elected.



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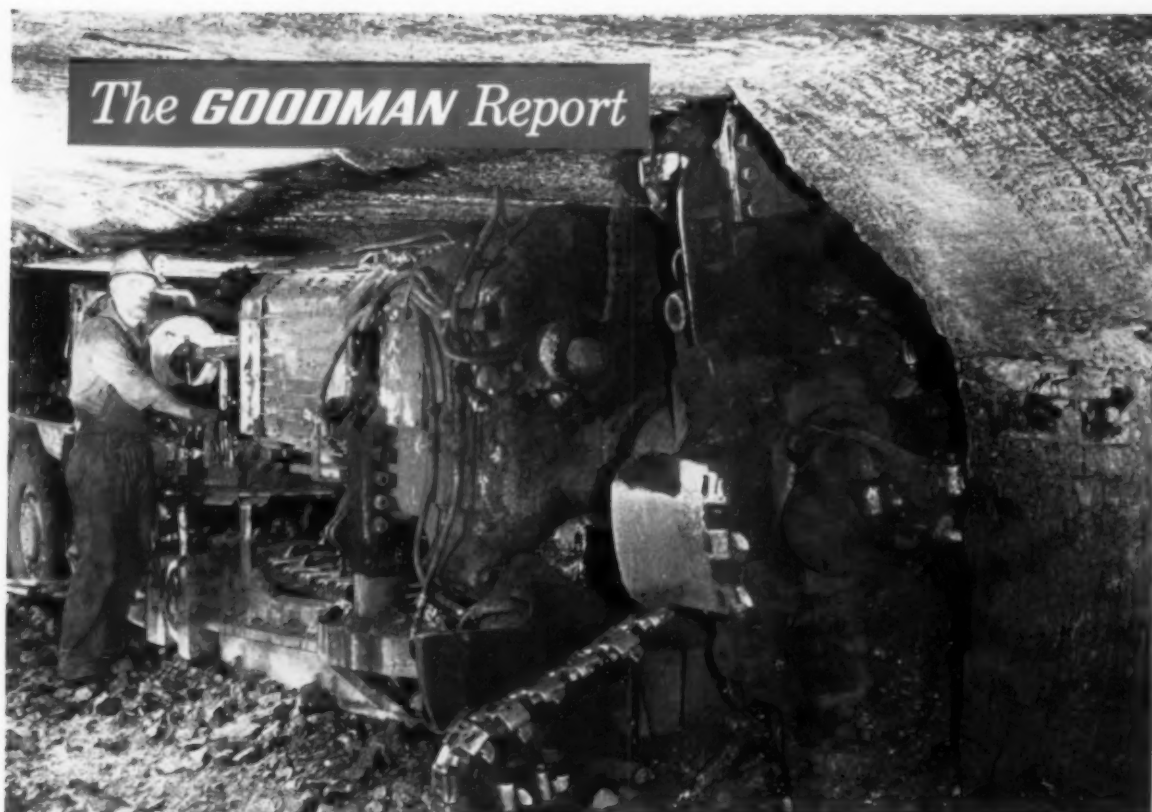
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The GOODMAN Continuous Borer

How to make More Money mining coal

The key is the GOODMAN Continuous Borer! On solid or retreat work, the tonnages produced by the Goodman Borer are *making more money* for operators in mines throughout the coal fields. Production records in 7' mining height report these typical averages.

Crew Size	Average tons per shift	Average tons per man per shift
8	740	92.5
7	861	123.0
8	1159	143.7
8	1243	155.3
7	855	106.8
8	819	102.3

Bottom was generally good. Shuttle Cars were the initial carriers of the mined coal.

At one installation, the face cost per ton was reduced to one half the conventional mining cost even when including labor, maintenance, and materials such as roof support supplies, rock dust, bits, oil and grease. Another mine reports a Goodman Borer production of 570,000 tons without need of an overhaul.

This high tonnage production, low down-time combination is built into every Goodman Continuous Borer. It's a combination that means savings in man hours and supervisory time . . . one that makes the lower capital investment look even better.

To sum up . . . your men spend more time at the working face, produce more coal with less supervision . . . and you have less capital invested when you put a Goodman Continuous Borer to work in your mine.

You can see the Goodman Continuous Borer in action. Let us arrange it. There's no obligation.

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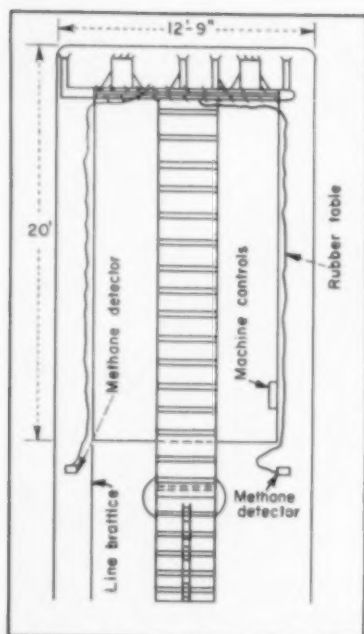


FIG. 1—Testing face atmosphere.

A need for more air at continuous-miner faces may force a return to . . .

Auxiliary Fans At the Face

A combination of blowing and exhausting fans, with the blower attached to the mining machine, may be the preferred system for improving face ventilation.

By R. W. Stahl, Mining Health and Safety Engineer
U. S. Bureau of Mines, Pittsburgh, Pa.

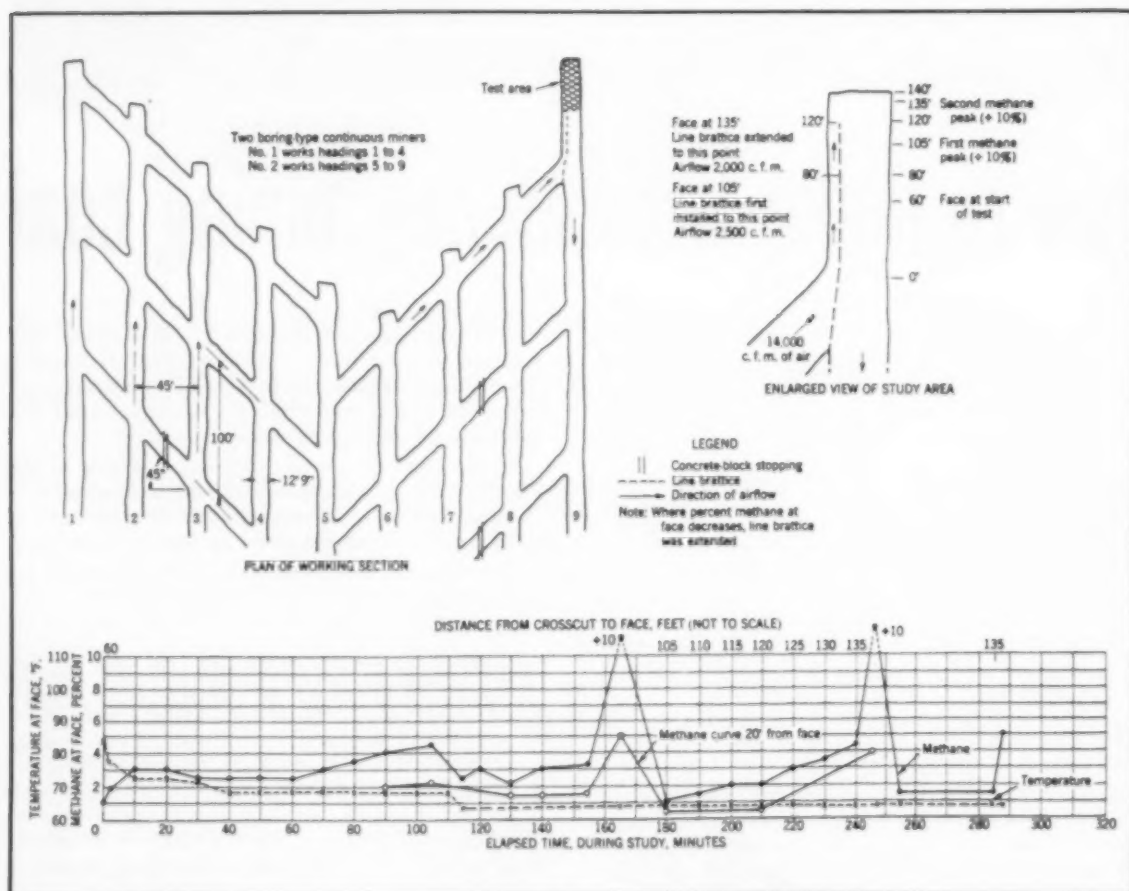


FIG. 3—Methane emission in multiple-entry system of continuous mining.

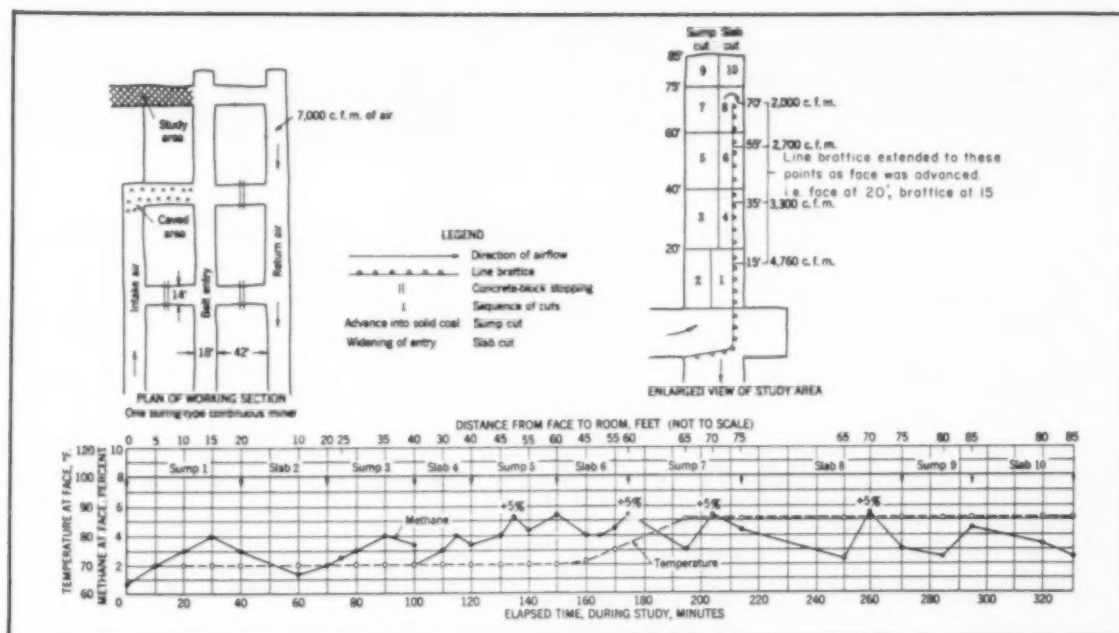


FIG. 2—Methane emission during operation of continuous-mining machine.

FACE VENTILATION has always been a rather difficult problem in coal mining because the apparatus needed to conduct air to the face interferes to some extent with other mining operations. The normal tendency is to neglect air circulation where it interferes too much with production. The safety-conscious foreman has a never-ending struggle keeping line brattice effective without lowering his coal output. The problem has been complicated further by the boring-type continuous miner, which virtually fills the face area and acts as a barrier to the flow of low-velocity air currents across the face.

Observations in continuous-mining places aroused the suspicion that gas might be trapped at the face, even in well-ventilated mines, and tests proved this to be a fact. Knowing that this situation existed, the Bureau of Mines entered upon a program of tests and studies to determine what might be done toward solving the problem without hampering production. The study is continuing. Here is the background and a description of what has been done so far.

Adapted from a paper presented at Coal Mining Institute of America at Pittsburgh, Pa., Dec. 13, 1937.

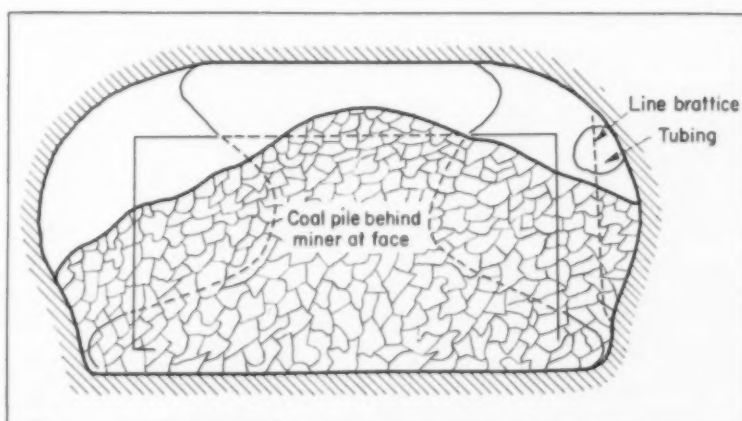


FIG. 4—Air flow obstruction near the face.

Machines Obstruct Flow of Air

Figs. 1, 2 and 3 show that explosive atmospheres do exist at the faces of otherwise well-ventilated boring-miner places. In addition, recent gas ignitions attest to the fact that something must be done if we are to avoid such a major catastrophe as would be entirely possible if a condition like that shown in Fig. 4 existed and the bits of the machine contacted some hard material.

It is virtually impossible to effectively ventilate a continuous-mining place using a line brattice because

the bulk of the machine limits the space available for installing the curtain, and consequently limits the volume of air that can be conveyed to the face. In fact, in very few instances is an attempt made to keep the line brattice closer than the rear of the machine, or 20 ft from the face. Even where enough air reaches the end of the line brattice, the discharge from the machine often fills the entry while a shuttle car is awaited, thus shutting off the flow of air. Examples of such obstruction are shown in Fig. 5.

To overcome this lack of space, as well as the restriction caused by

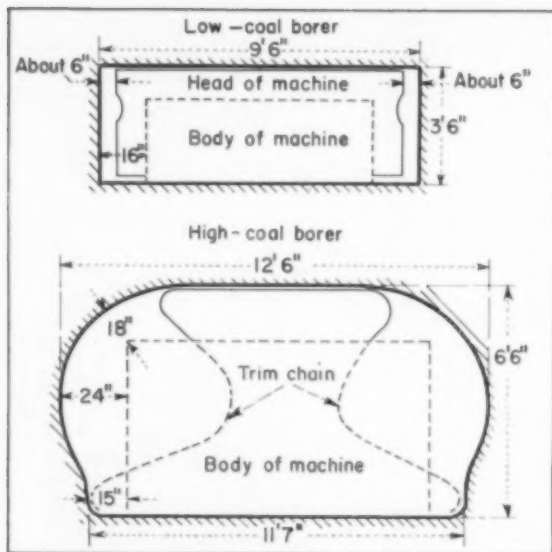


FIG. 5—Bulk of machines restricts air passages.

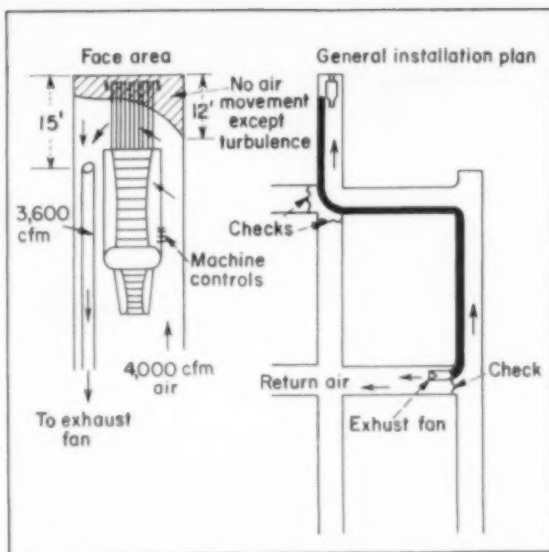


FIG. 6—Auxiliary face ventilation, exhaust system.

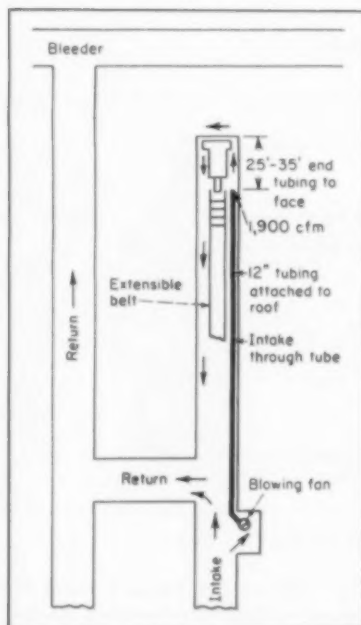


FIG. 7—Auxiliary ventilation, blowing.

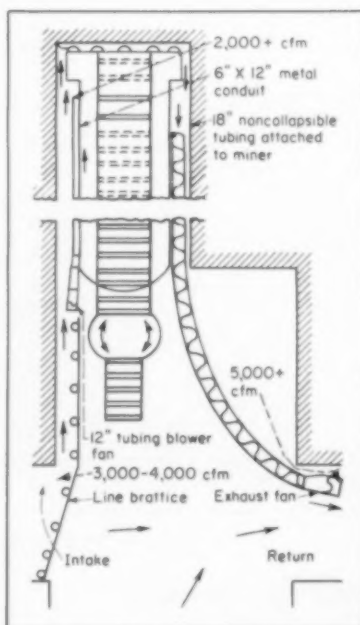


FIG. 8—Combination system.

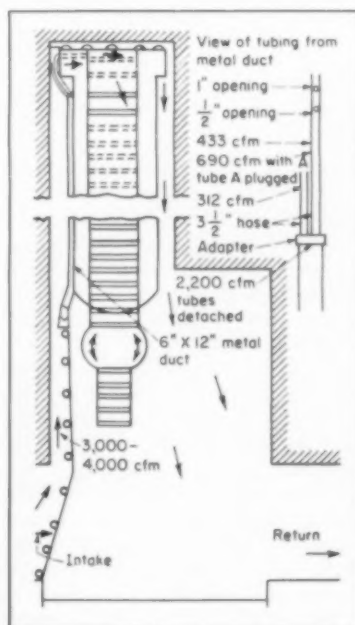


FIG. 9—Boring-head airtube.

the system of transportation, an auxiliary fan or a combination of these fans seemed to offer possibilities.

The use of auxiliary fans is prohibited by law in many states and the Bureau of Mines was instrumental in promoting their discontinuance. These actions were the result of abuses in practice and changes in mining methods.

It may appear to be an "about face" to recommend their use, but

introduction of the boring-type machine makes this necessary if we are to attain maximum safety and efficiency with this very useful machine. Some mining companies, recognizing the need for a better system of face ventilation, have been experimenting with blowing and exhausting fans, which can only be used at present by permission of the Joint Industry Safety Committee and in some instances with additional state approval.

The Bureau of Mines obtained a permit to make tests with auxiliary fans. In conjunction with state mining departments and with the generous cooperation of mining companies the tests were begun in June 1957 and are continuing.

Test procedures and the relative merits and disadvantages of the three systems tried are explained in the following material, along with a variation tried in a Colmol place.

How Farval lubrication saves labor, eliminates bearing troubles on power shovels

FARVAL—
Studies in
Centralized
Lubrication
No. 156

WATCH a power shovel tear into rock, slate, gravel, or dirt. It's dig, hoist, swing, dump—over and over again, hour after hour, day after day. Work like this soon ruins improperly lubricated bearings. That's why it pays to install the Farval Centralized System of Lubrication on quarry and mine shovels like the one shown.

It takes just a minute or two, even on a big six-yard shovel like the Bucyrus-Erie 150-B, for Farval to lubricate every bearing needing protection for heavy duty. Compare this to stopping the shovel for 15 to 20 minutes each time the operator needs to lubricate by hand—and then he has to climb around looking for grease fittings.

FARVAL FIGHTS FRICTION

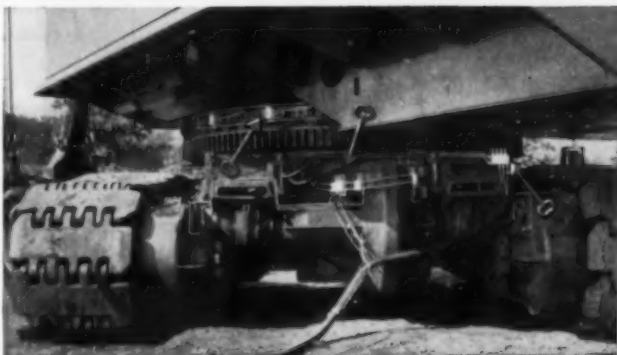
Farval delivers any oil or grease that can be pumped under pressure to any number of bearings from one central station, in exact quantities, as often as desired. The rugged Farval valve has only two moving parts—is simple and sure. No uncertain springs, ball-checks or pinhole ports to cause trouble. Any grit, abrasive sand or dust that has penetrated the bearings is forced out by the measured injections of lubricant, and the lubricant forms a protective seal. Hazards due to hit-and-miss hand lubrication are eliminated.

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Experience shows that Farval saves as much as 45 minutes of each hour of oiling labor—up to 3 of every 4 pounds of lubricant consumed by other methods.

If you make or use power shovels, conveyors, crushers, shaker screens, elevators or other heavy equipment, your machines will run longer and produce more if you install Farval. Farval protects millions of bearings throughout industry. Write now for Bulletin 26. The Farval Corporation, 3288 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



KEYS TO ADEQUATE LUBRICATION—Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine will be properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.

Pictured is the Farval-lubricated truck frame of a Model 150-B six cubic yard power shovel. Photo courtesy of Bucyrus-Erie Company.



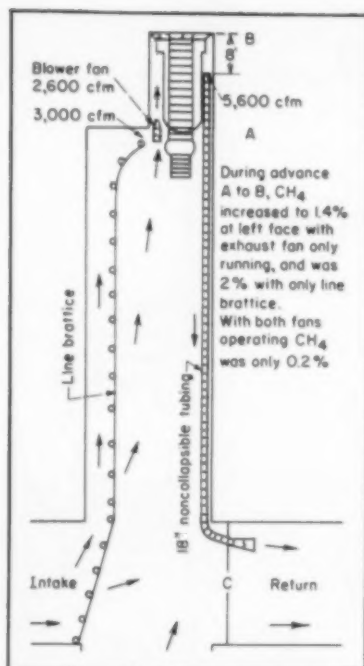


FIG. 10—Results with auxiliaries.

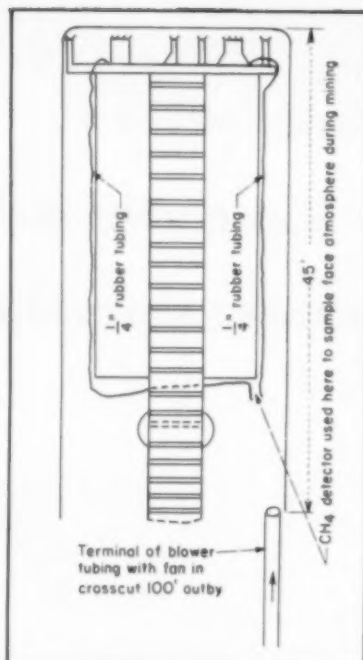


FIG. 11—Blowing fan alone.

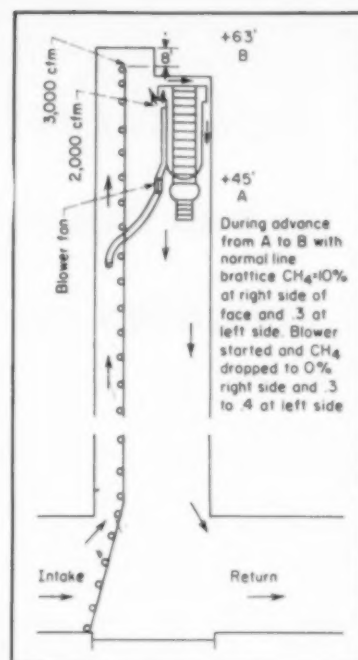


FIG. 12—Blower and line curtain.

Using Auxiliary Fans

Exhausting System—A 5-hp, 18-in axial-flow fan (5,600 cfm, free-air discharge) was installed on the return side of the place, generally in the first crosscut outby the face. Tubing of 18-in diameter was suspended from spads or roof bolts to a point ahead of the machine operator as shown in Fig. 6. Air flow can be induced as far as the head of the machine. This system removes considerable dust which escapes the water sprays at the face and makes for more comfortable operation. Unfortunately, it does not remove gas from the face area satisfactorily.

Blowing System—A 1½-hp, 12-in axial-flow fan (2,600 cfm, free-air discharge) was installed in the first outby crosscut on the intake side of the working place, and 12-in tubing was suspended from the roof to a point near the face (Fig. 7). Even with the end of the tubing as far as 35 ft from the face, air reaches the face to dilute methane as it is liberated. The only real objection to the blowing system is the dispersal of dust which results, especially where the ribs are not wet. No objectionable dust was noted where sufficient water sprays are used and where the ribs are wet as far back

as the end of ventilation tubing.

Combination System—With the two fans in combination as shown in Fig. 8, the ideal in face ventilation is approached. Air reaches the face through the forced-air tube to dilute methane as it is liberated and the dust- and gas-laden air is withdrawn from the face area through the exhaust tube and discharged into the return airway.

It is realized that the dual tubes in a working place are impracticable. The system is not contemplated to be final and usable for face ventilation. What has been discussed and deemed entirely within reason is a system whereby a small blower could be made an integral part of the machine, with some form of conduit to carry the air to the face and only the exhaust tube in the working place to carry away dust and gas.

Fig. 9 shows a scheme tried with a Colmol. The construction of the machine permitted attachment of a perforated tube at the head of the machine between the rotors. The tube received air from a blowing fan, as shown, and gas was dissipated satisfactorily.

Face ventilation can be achieved using a line brattice. But can the average operator afford the air nec-

essary to do the job? A prerequisite to proper air circulation at the face is velocity at the end of the brattice sufficient to carry the air along the side of the machine to the face. Herein lies the difficulty, because leakage through a good line brattice is tremendous and a large volume of air must be introduced at the outby crosscut to have sufficient velocity 100 ft in advance near the face.

Recent observation at a good installation where air was in abundance showed a 95% loss in 100 ft. The volume in the crosscut was 80,000 cfm, and with a good line curtain only 4,000 cfm was reaching the rear of the mining machine. In this instance a velocity of 130 fpm could be measured at the face, thus providing good ventilation in spite of leakage. But how many mines can afford such large quantities for one working place?

Actual tests in which gas was satisfactorily removed during the operation of continuous-mining machines are shown in Figs. 10, 11 and 12. The gas accumulated at the face with the conventional line brattice installed, but the use of a fan or fans cleared the atmosphere immediately, strongly indicating that auxiliary fans will do the job.

In one instance the gas concentra-

tion at the face exceeded 10%, which of course would have necessitated stopping the machine and clearing the place of gas. However, when the blowing fan was started the face remained clear during a 30-ft advance. During this period the fan was stopped occasionally and the gas concentration immediately built up. The face remained clear if the fan was used.

The Possibilities Ahead

It appears from results to date that a combination of fans would produce the ideal result, although in many instances a simple blowing fan may do the job. The latter requires that sufficient water be used to prevent the raising of dust and that gas liberation is not so great as to be a hazard until it reaches the return airway.

Before definite systems can be recommended to the industry, some additional information must be acquired. Average gas liberation, in cfm, must be known to determine the required fan capacities. The feasibility of attaching fans to the various types of boring machines must be explored. And the cost of auxiliary-fan installations against that of line-brattice installations must be weighed.

The cost of auxiliary-fan installations might be inconsequential if the mining machines could be operated continuously rather than intermittently, as is now the case where excessive gas liberation makes it necessary to withdraw the machine frequently to free the face of gas.

Since the tests are being continued primarily to prove beyond doubt that auxiliary-fan ventilation will permit safe work in gassy places, all suggestions are welcome in order that the best solution to a serious problem may be found.

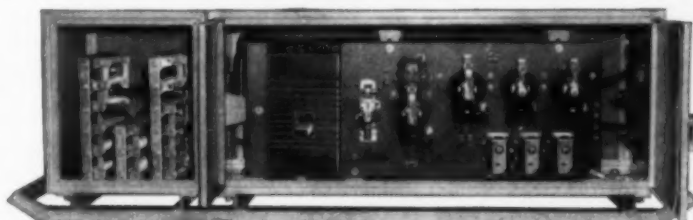
Coming in Coal Age . . .

COST CONTROL—The industrial engineering approach to cost control will be the theme of a special report scheduled for the April issue of *Coal Age*. Topics covered will include fitting industrial engineering into the management setup, how operating management and supervisors participate, time studies for methods revision and standards—setting, production incentives and control machinery, including budgets.

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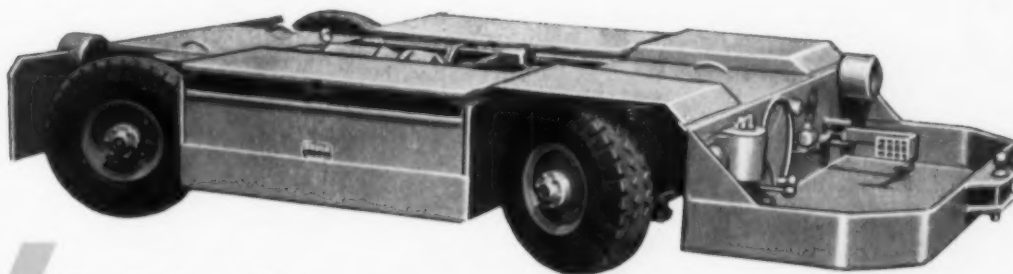
steps. A wide range of "Job-Rated" axles, transmissions, tires, springs and other components makes possible gradual increases in capacity and assures you a dependable, economical truck because it fits your job exactly.

In economy, Dodge provides the thriftiest and most efficient engine and transmission combinations. A range of eight engines and eight transmissions, including automatic Torqmatic, makes this possible. You save on gasoline, too, because Dodge engines operate efficiently on regular gasoline!

Priced competitively throughout the line, in many models Dodge is priced *lowest*! No matter what Dodge *Power Giant* your job calls for, you'll be agreeably surprised at its thrifty price tag. See your Dodge dealer soon, and get his special 40th-Anniversary deal!

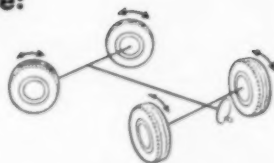
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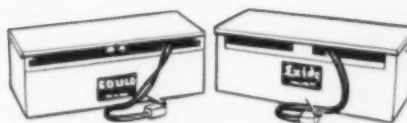
Value is its ample ground clearance and three-point frame suspension for good roadability over rough and muddy mine bottom.



Value is its low overall height of only 24" — making it adaptable to the lowest coal being mined today.

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DISTRIBUTION SYSTEM of Princess Elkhorn Coal Co. showing location of overhead pole lines, high-voltage substation, boreholes, underground cable, synchronous converters, capacitors and transformer banks for preparation plants, fans, and shops.

How Princess Elkhorn Distributes

By emphasizing proper design, high-quality construction and a program of system improvement, Princess Elkhorn enjoys the benefits that a good distribution system provide: fewer power failures, good system power factor, reduced power bills and safety.

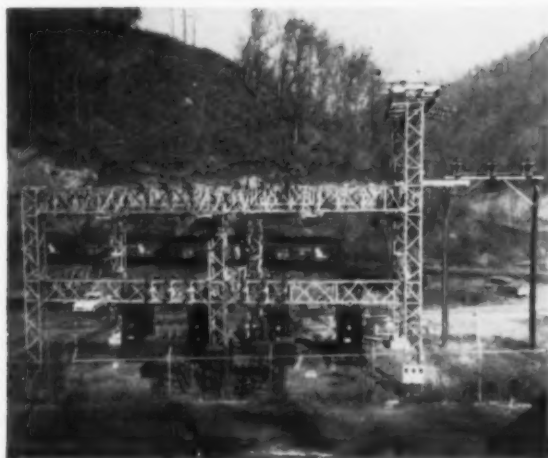
THE AC DISTRIBUTION SYSTEM of the Princess Elkhorn Coal Co., David, Ky., receives a high maintenance priority because top management and maintenance supervisors recognize the importance of a well-planned and properly-maintained system. And, as a result, they have developed a system whereby overhead

pole lines distribute power at 7,200 V to keep line losses at a minimum and also to provide a better opportunity to feed most key points from two directions. A 95%-plus power factor is maintained with the aid of capacitors and voltage regulation keeps load terminal voltage at nameplate ratings.

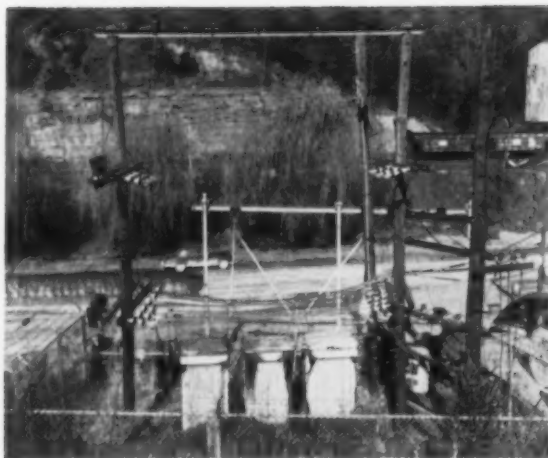
By constantly analyzing the power demand and by maintaining a rigid maintenance inspection policy, the company has developed a highly efficient and dependable power system and enjoys four benefits that only a good distribution system can provide:

1. Power failures are less frequent.
2. System power factor is good.
3. Power bills are held to a minimum.
4. Protective equipment insures maximum reliability and safety to men and equipment.

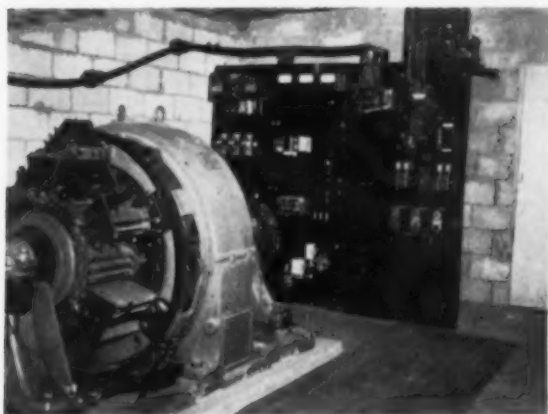
Princess Elkhorn's management is aware that good distribution systems do not happen. They are the result of planning for present as well as



POWER COMPANY'S SUBSTATION provides an alternate power source in case a failure occurs on the regular line.



TRANSFORMER BANK at No. 1 preparation plant is safeguarded with properly fused disconnects and lightning arresters.



SYNCHRONOUS CONVERTERS feature automatic starters and safety devices, are controlled by skipper-type time clocks.



POWER DESIGNERS are Walter M. Crace, superintendent maintenance (left) and F. E. Harmon, power engineer (right).

AC Power

future demands, adopting maintenance standards to meet the needs of the individual system and when necessary, improving the system to comply with changing conditions around the property.

Before Princess Elkhorn evaluated the efficiency of its power system or adopted maintenance standards, all equipment and operating data had to be recorded. This was done. First, an inventory was taken and included all equipment directly or indirectly connected to the system, such as, transformers, length and size of transmission lines, number and location of power poles, description of hardware on each pole, including guy lines, and type and rating of protective devices.

Second, operating data were recorded and included primary and secondary voltage ratings, summation of loads, voltage ratings at load terminals, present demand rating and system power factor.

Purchased Power

Power is purchased from the Kentucky Power Co. on the LCO tariff (large capacity operation) and on a monthly basis. The power company transmits power at 44,000 V by either of two transmission lines terminating at the power company's substation located near the mine. This high voltage is reduced to 7,200 and metered at a central metering sta-

tion at a 1,600-kva demand value.

The power company is equipped to supply power by either of two distribution lines. This system has the advantage of providing an alternate power source in case a failure occurs on the regular line. Each source is equipped with an oil circuit breaker which permits transferring the load from one to the other.

The power supply is isolated from ground and all transformers are installed with isolated delta primaries. Princess Elkhorn's distribution system consists of approximately 9 mi of transmission lines, including 2 mi of underground cable. This system delivers power to nine synchronous converters, two preparation plants, mine

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still is your wisest choice for many uses. But on those jobs where an extra bonus in strength, toughness, and resistance to wear are called for, you'll be dollars ahead to insist on TRU-LAY VHS.

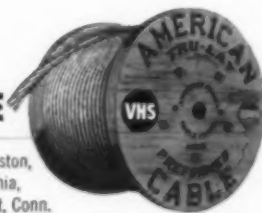
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Supervisory Personnel Princess Elkhorn Mine

William Crawford, Vice President—Operations

C. T. Dahlin, General Manager

Gene Matthis, General Superintendent

Raymond Bradbury, Director of Industrial Engineering

Ray Spears, Safety Director

William Mullins, Chief Engineer

Earl McDonald, Preparation Director

Lon C. Hill, Director of Purchasing and Warehousing

James R. Camicia, Auditor

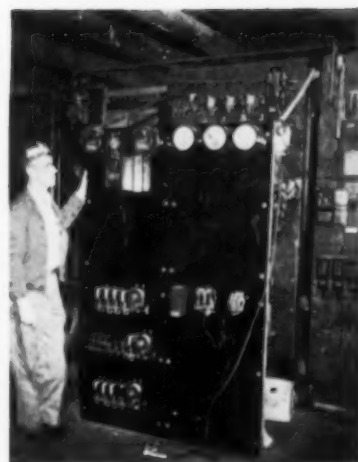
Walter Crace, Maintenance Superintendent

Tandy Bartley, No. 1 Mine Foreman

Harmon Tussey, No. 2 Mine Foreman



CAPACITOR BANK near No. 2 preparation plant corrects power factor.



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fans, shops and lighting. Total converter capacity is 2,125 kw at 275 V DC. Preparation plants Nos. 1 and 2 are served by three 150 and three 125 kva, single-phase, 7,200/440-V transformers, respectively.

Power Factor

Although Princess Elkhorn is not penalized as a result of a poor system power factor under the LCO tariff, its management appreciates the benefits of good power factor. By installing capacitors to improve power factor, the company has reduced the wattless current which, among other things, helps reduce power bills. "It is bad business to pay for power that does not benefit the consumer," says Walter M. Crace, superintendent of power and maintenance. "Our company realizes that a good system power factor reduces the load on the system and consequently cuts maintenance cost in addition to increasing equipment life and promoting safety. A 95%-plus power factor is maintained."

Princess Elkhorn's distribution system is based on overhead pole lines to surface substations and facilities. This type of system, it was felt, would contribute more to the attainment of the company's three basic objectives. These objectives are as follows:

1. Adequate capacity.
2. High-quality construction, including workmanship and material.
3. Maximum protection to equipment and personnel.

Boreholes and cables are used to distribute power to underground installations. When substations advance beyond boreholes, underground cables are extended until cable distance warrants extending pole lines and drilling a new borehole. Overhead pole lines are bare wire, No. 2 AWG, and underground cables are 3-conductor, No. 4 AWG, 7.5-kv, with each phase grounded and a copper braid over the assembled conductors.

Locating its primary distribution system on the surface provides the company with a better opportunity for developing a system to feed most key points from two directions. The company also maintains that overhead pole lines and boreholes are less costly than underground systems. As an example, 5,500 ft of overhead pole lines were recently added to the system. The complete cost, including clearing right-of-way, equipment and labor was far less than the underground cable alone would have cost the company.

Voltage Regulation

To date, voltage regulation has not been necessary. But plans are on the board to install a voltage regulator on one branch of the distribution system. It will compensate for line losses resulting from increased transmission distances and will boost the voltage 10%. The location of the regulator is most important and its position in the line has been selected to reduce line losses as much as possible and to

deliver a good working voltage to all load terminals.

Substations

Surface and underground substation transformers are connected delta-wye and safeguarded with properly rated fuses. Synchronous converters are protected with breakers in both AC and DC circuits. All units are equipped with automatic starters. At present, these substations are controlled by skipper-type time clocks to stop them at predetermined periods when power is not in demand, such as, weekends and off shifts, and to start them before production shifts report to work.

The company plans to install an electronic device to start and stop all or any one substation from a central point. The master control will be located in the maintenance office of the main shop. This unit will give positive control of substations and eliminate delays where travel to station is required.

The most important point emphasized by management at Princess Elkhorn is that power systems do not remain unchanged. Improvements must be made to keep abreast of changing mining methods, conditions and equipment in order to maintain an efficient and dependable power supply. To get all the benefits provided by a good distribution system, Princess Elkhorn therefore follows through on design, construction and maintenance with a program of system improvement.

WEMCO FLOTATION FOR FINE COAL CLEANING

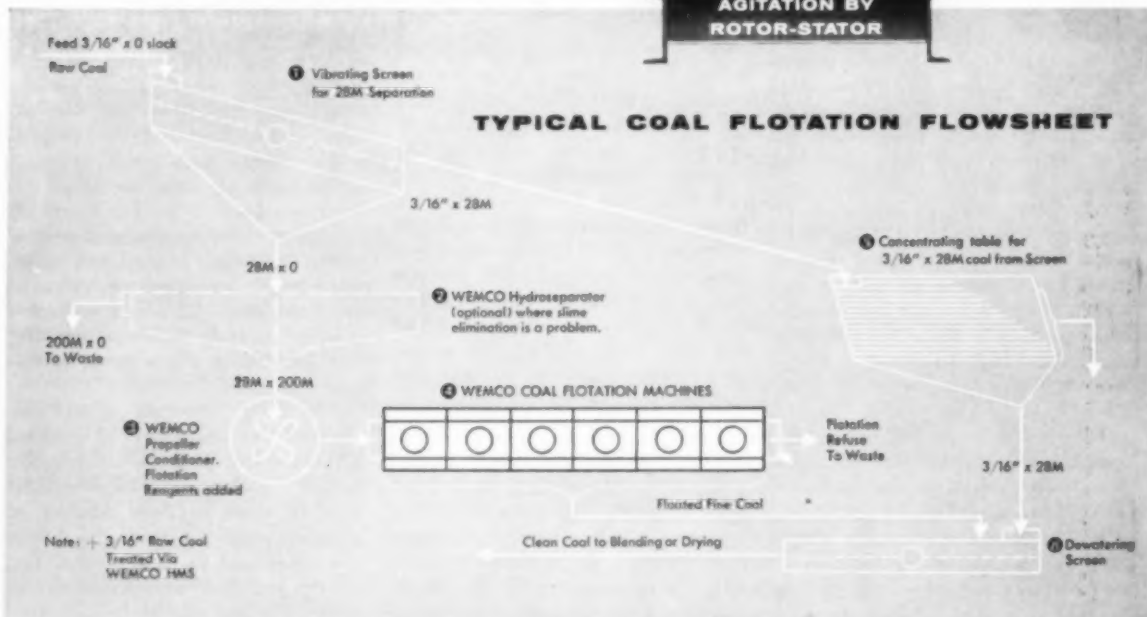
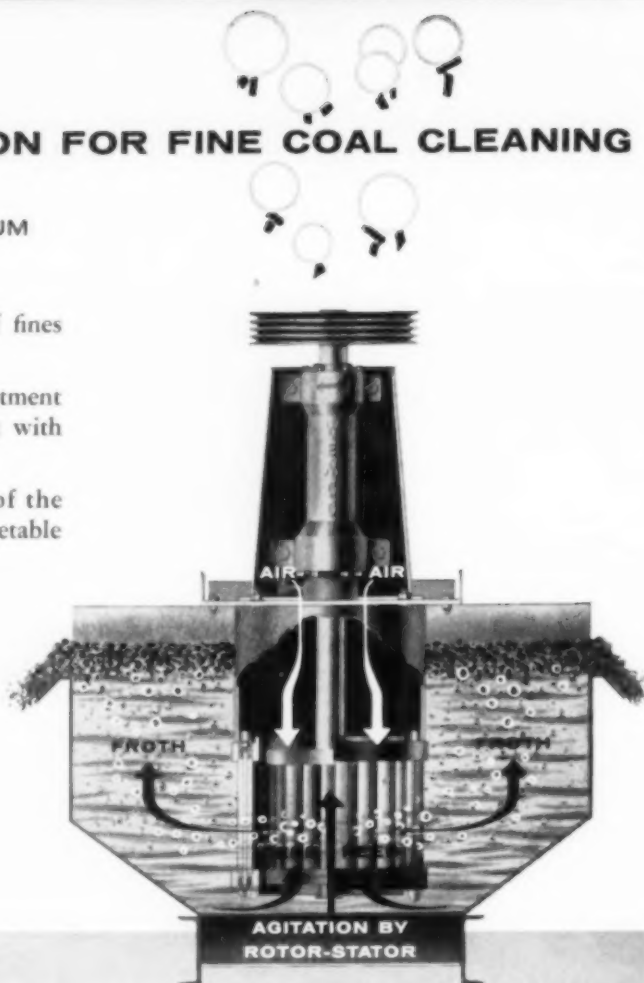
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Barber-Greene standardized conveyors permit faster quotation and delivery, lower cost erection, easier future alteration. Pre-engineered components include: Frames, Trusses, Drives, Take-ups, Feeders, Hoppers, Brakes, Housings, Supports, etc. Ask for the Barber-Greene 192-page Conveyor Catalog.



Over 4,300' of Barber-Greene Belt Conveyors handle 45,000 to 55,000 tons of coal each month at the Saucedo mine in Palau, Mexico. These conveyors move the coal to the transfer bin for loading, to the stacker for stockpiling and reclaiming . . . or to the processing plant.



This 119' Barber-Greene Stacker pivots on a curved track to deliver up to 250 tons per hour to any of five silos. Built for the Chicago Wilmington & Franklin Coal Company, this Barber-Greene installation has a capacity that can be quadrupled when required.

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COAL AGE • March, 1958

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The Beltman's Guide

How to install and operate belt conveyors for long, safe, trouble-free life.

How to troubleshoot belt-conveyor operation and belting difficulties.

DON'T shorten belt life by improper handling and storage.

☐ Store belts in an upright position. For short periods of time a roll of belting can be set on a smooth, dry, level floor. For longer periods, suspend on a horizontal bar. Never lean a roll of belting. Never store a roll on its side.

☐ Store in a cool, dark place. Avoid storage places where oils, gasoline and painting materials are stored or used. Also avoid places where ozone, which is very hard on rubber, may be produced by electrical equipment or welding. Covering with heavy waterproof paper is desirable. Used belts stored underground or in other areas where dampness may be encountered should have the edges coated with rubber cement to keep out moisture.

☐ Handle new and old belts carefully. Do not drop. Do not pry or roll with bars. Roll crated and rolled

belts in the same direction as the roll is wound. If rolls are handled with slings, use bar through center for lifting and protect belt edge with plank. Do not handle with sling around roll. Do not bend belt more sharply than minimum pulley diameter in handling and installation.

☐ Use proper equipment and methods in moving belt in mine. Preferably wind it on a horizontal spindle and move it upright. However, in low coal it may be wound on a vertical spindle. In both instances the spindle should be mounted on an appropriate truck-rail or rubber-tired. Less preferable is lapping belt over mine cars or into shuttle cars or trailers, but it can be done with care—especially take care to avoid bends smaller than minimum pulley diameter. This latter, incidentally, is a good rule all the time.

DON'T invite trouble by faulty conveyor installation.

☐ Alignment is critical with portable underground belts as well as permanent types—slope and other.

☐ Keep within recommended limits for vertical curves.

☐ Keep belt level crossways.

☐ Provide proper clearance. This facilitates inspection and maintenance, as well as avoiding damage or faulty operation.

☐ Provide solid foundations or footings for both permanent and temporary belts to prevent the development of misalignment and other conditions leading to trouble.

☐ Align idlers properly. Provide added insurance by judicious use of self-aligning idlers—at intervals of, say,

200 ft on return and 400 ft on carrying side, and close to head and tail pulleys for centering to receive and discharge material.

☐ Make sure that loading and discharge chutes are properly constructed and aligned, and that provision is made to eliminate impact or reduce it to a minimum in loading.

☐ Make sure that skirtboards are properly designed and installed. DO NOT use old belting for skirting. The ingrained coal and rock particles make it act like sandpaper. Use special skirting material available from belt manufacturers.

DON'T sacrifice belt life by faulty installation methods.

☐ Check conveyor and component parts thoroughly before belt installation, including structure, pulley, idlers, loading equipment and skirtboards or skirting facilities—particularly for alignment and clearance.

☐ Position belting roll properly, whether on a horizontal or vertical spindle.

☐ Unwind belt by power if possible—from top of roll if fed into carrying rolls, or from the bottom if onto the return idlers. A wire rope and pulling plate may be used, or the new belt may be attached to the old in replacement.

☐ Keep belt tight as it is unrolled to prevent twisting or telescoping. Avoid sharp twists, bends and hard pulling. Unwind slowly. Be careful of catching and kinks.

☐ Pull belt into position by block and tackle, winch or similar equipment, using special clamps on end to distribute pull evenly across entire width.

☐ Exert sufficient tension in pulling belt together so that screw-type takeup is in proper position when splice is made. With counterweighted gravity-type takeup, apply sufficient force to move takeup pulley from maximum position to correct position.

☐ Check training, including return run, and tail pulley.

☐ Check for deflection and take any necessary corrective steps.

☐ Check for alignment and rubbing with loading and discharge chutes and skirting.

Don't increase the possibility of damage or destruction by neglecting belt protection.

☐ Keep belt headings clean and clear of obstructions, tools and materials.

☐ Provide proper roof and rib support.

☐ Keep belt headings free of water and protect conveyor and belt from drips.

☐ Use approved cables, wire and electrical equipment and install in a safe manner.

☐ Ventilate beltways properly and rock dust to prescribed standards.

☐ Reduce the fire hazard by . . .

1. Using approved flame-resistant belts, and fire-resistant materials for pulley lagging, impact idlers, skirting, etc.

2. Guarding against frozen or hot-running rollers by regular inspection and proper lubrication.

3. Establish correct tension.

4. Eliminating spillage and overloading.

5. Preventing roof fall.

6. Keeping the belt dry to prevent slippage.

7. Insuring proper training by correct alignment and leveling also proper clearance to prevent rubbing.

8. Using roller switches or other devices to stop the motor when the belt slips or stops.

9. Preventing pileups at loading and transfer points.

10. Keeping coal, rock and material of all types away from the belt and conveyor.

11. Installing automatic overload and heat-sensitive switches.

12. Using automatic takeups.

13. Using rubber drive pulley or grooved lagging.

14. Checking all elements regularly.

☐ Provide proper fire-fighting equipment, including extinguishers and rock dust. Some operators also parallel long-lived belts with water lines.

☐ Install equipment to prevent accidental reversal or overspeeding.

☐ Provide emergency stop protection, such as, the two-wire low-voltage system or the pull-wire system above or alongside the conveyor.

☐ Protect the belt against damage. Some of the steps taken to eliminate the fire hazard also protect the belt. Others include:

1. Sequence start-and-stop, plus provision for test run

out of sequence where two or more units are operated in tandem.

2. Pile-up protection (paddle switches, finger switches, etc.) at loading and transfer points.

3. Chutes which place the material on the belt in the same direction and at the same speed, fines first. If other loading points are operated inby, the chutes must be designed to swing up to permit passage of large lumps.

4. Feeders or feeding conveyors to accomplish the same purpose as chutes.

5. Automatic controls to permit only one feeding unit to run or to cut both to half speed when two units feed to a belt. Same principle can be used with three or more.

6. Loading between idlers or using cushion-type equipment to reduce impact. Also reduce chute angle at point of feed to belt to cut impact of lumps and prevent bouncing. In permanent installations where the tonnage is high, a short feeder belt may be employed to take the beating when coal is discharged from, say, an underground dump bin. Another device is a short pad belt under the main belt at the loading point.

7. Magnetic detectors or other equipment to protect against tramp iron, especially on mainline and slope installations.

8. Skirt boards, skirting and shapers as required to shape the load, help position it properly, and prevent spillage. Skirt boards and skirts should widen and also rise as they leave the loading point to prevent jamming of material. If contact with belt is necessary, use rubber, not old belting, which is highly abrasive.

9. Controlled starting — not across-the-line. Avoid abrupt stops.

10. Belt cleaners. A good one is a piano wire positioned 1/8 in. away. Prevent buildup of material on pulley faces, also the trapping of lumps, both of which result in severe carcass damage.

11. Keeping oil off belts. If oil-treated coal must be handled, special oil-resistant covers are available.

12. Mildew-inhibited belting.

13. Proper lubrication.

14. Periodic inspection.

15. Prompt repair of damage.

DON'T lay the groundwork for personal injury by neglecting safety precautions.

In addition to previously outlined electrical, fire, ventilation and other precautions tending to reduce personal hazards . . .

☐ Provide adequate clearance, especially where men ride belts.

☐ Use guards and railings at drives and other points where men might come in contact with belt or machinery.

☐ Provide stilts or bridges at belt crossings.

☐ Require that men working around conveyors—handling supplies, etc.—wear snug-fitting clothing at all times on the job.

☐ Permit no work on the conveyor unless it is stopped and locked out.

☐ Provide emergency stop facilities all along conveyor lines.

☐ Set up and observe safety rules for riding of belts.

☐ Keep beltways clean and free of loose materials.

☐ Use extension grease lines.

☐ Use nonflammable, nontoxic cleaning fluids in splicing operations.

☐ Provide a cache of gas masks at each drive for use in fighting a fire if one occurs.

(Continued on p. 125)



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Troubleshooting Belt Operation

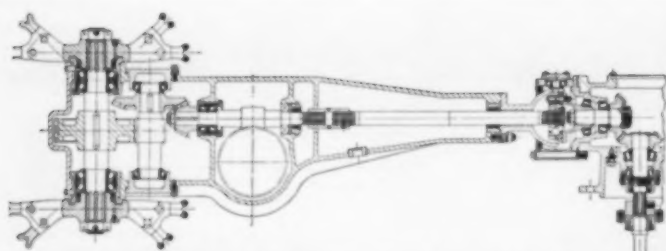
Belt runs off-center for long distances	Off-center loading	Adjust chutes and other loading devices to put load in center in direction of belt travel
Belt runs off-center at a specific point or climbs sideways on same idlers	One or more idlers immediately ahead of trouble point not square	Advance end of idler to which belt has shifted in direction of belt travel
	Conveyor frame not straight	Straighten, using stretched string to determine how much
	Idler stand or stands not centered	Same correction
	Idlers stick	Lubricate properly
	Loose idler	Reposition and fasten securely
	Low conveyor side	Level up and secure
	Material builds up on idlers or terminal pulleys	Improve maintenance; install belt-cleaning equipment
Belt runs off at terminal	Pulley or approaching idlers not square	Align properly
Specific section of belt runs off-center all along conveyor	Crooked belt as a result of storage of telescoped rolls or with one edge close to damp ground or wall; stretching of worn edge because of high tension, or shrinkage from moisture absorption	If "how" is in new belt, it may disappear when belt is broken in. In belts in service eliminate cause of bowing; if impossible, replace with new section
	Joint not square in mechanical splice or steps not matched in vulcanized splice	Resplice, being sure to square ends or match properly with vulcanized type
Belt wanders at random	Too stiff because of design	Use belt with more transverse flexibility or add extra aligning aids and tilt troughing idlers ahead not over 2 deg
	Too stiff because of newness	Allow proper break-in time. Speed up by letting belt stand loaded overnight
Surface belt runs off-center at certain times	Wind pressure and effect of sun on side of steel conveyor frame	Use covers or wind deflectors, plus self-aligning idlers. Use reflective point on frame
Belt stretches excessively; splices weaken prematurely; cuts or breaks enlarge quickly	Excess starting tension; excess belt tension	Increase speed, keeping tonnage the same, or reduce tonnage at same speed. Even up feeding rate. Decrease drag by proper idler lubrication, replacement of worn idlers and removal of spilled material. Lag drive pulley or increase the wrap by snub pulley or tandem or dual motor drive. Use minimum-weight counterweight. Replace with lower-elongation belt

Troubleshooting Belt Damage

Belt edges worn or gouged	Rubbing	Realign belt if necessary. Remove all obstructions
	Off-center loading, misalignment, defective self-aligning idlers	Reposition loading and transfer chutes. Align belt. Repair or replace faulty idlers.
Excessive top-cover wear	Poor cover quality	Replace with heavier cover or higher-quality rubber
	Slow-running, stuck or misaligned return rolls	Clean belt and keep clean with belt cleaners. Service and realign return rollers. Use rubber-disc return rolls if necessary
	Excessive sag between idlers; coal works or shuffles	Check tension—increase if too low. Reduce idler spacing and/or graduate, particularly at loading end
	Abrasive skirt boards	Use rubber skirt material, not old belting
	Poor loading	Feed coal onto belt in same direction and at same speed
	Pileup at head and tail pulley	Keep clean. Load properly

(Continued on p. 127)

Cuts and loads 2 to 4 tons of coal per minute— TIMKEN® bearings take the heavy shock loads



LEE-NORSE mounts the cutter heads and drives of its model CM-33X Miner on Timken bearings as shown above, to take heavy loads, cut maintenance.



CUTTING and loading coal at a rate of 2 to 4 tons a minute sets up heavy shock loads in this Lee-Norse continuous "Miner". Yet, in one shift, it turns out 400 to 500 tons of coal, and with minimum maintenance. The 52 Timken® tapered roller bearings in the Miner help assure this steady performance.

Timken bearings take the shock loads of high speed cutting from any direction. Their rollers and races are case-carburized to have hard, wear-resistant surfaces over tough, shock-resistant cores. Full

line contact between the rollers and races provides extra load-carrying capacity. And because they are tapered Timken bearings take *both* radial and thrust loads or any combination. Bearings and parts last longer.

In an atmosphere of coal and dust, efficient closures are vital. By keeping shafts concentric with their housings, Timken bearings make closures more effective. Dust and dirt stay out. Lubricant stays in. Maintenance is reduced.

To further insure bearing quality, we even make our own fine alloy

steel. No other American bearing maker does. So for your No. 1 bearing value, specify bearings trademarked "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".



This symbol on a product means its bearings are the best.



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TAPERED ROLLER BEARINGS ROLL THE LOAD

Top-cover damage—gouging, grooving, ripping or stripping	Stiff skirt seal riding on belt	Use more-pliable seals. Do not use old belt
	Excessive openings between belt and seals	Adjust to minimum clearance
	Material trapped under skirts as a result of belt dropping down under loading impact	Use cushion or pneumatic idlers to keep belt up
	Chute lips and skirts too close to belt; no gap increase in direction of belt travel	Prevent jamming by providing a gap of at least 1 in increasing in travel direction
	Coal jams in chute	Redesign chute for proper angle and width
	Coal jams under chute	If along belt line, provide hinges so chute can swing up. At end install baffles or improve loading to prevent pileup back of chute
Bottom-cover wear	Tramp-iron puncture or rip	Use rip protector, magnetic removal equipment or detector interlocked with driving motor. Short surge belt ahead of say, main slope belt, worth consideration
	Drive-pulley slippage	Adjust screw takeup or counterweight to increase tension. Lag drive pulley (grooved lagging if wet). Increase arc contact with snub pulley or tandem drive
	Sticking rollers	Service and lubricate properly
	Excess troughing-idler tilt	Not over 2 deg from upright
	Bolt heads protruding above lagging	Tighten bolts. Replace worn lagging. Use vulcanized-on lagging
	Material buildup due to spillage or other reasons.	Use good chute-loading facilities. Do not load belt too heavily. Deck under top run. Use plows or scrapers ahead of tail pulley on return run. Use plate or vulcanized splices to check leakage. Inspect and clean up regularly
Carcass breaks—star or edge parallel	Impact	Load at flat angle, at belt speed and in line with belt. Use cushion idlers
	Material trapped between belt and pulley	Plows or scrapers ahead of tail pulley on return side
	Material building up on pulleys	Use proper belt cleaners
Crescent breaks, mushy spots	Mildew	Use mildew-inhibited belt
Crosswise breaks at edge	Belt edges folding up	Use limit switches to stop excessive shifting of belt. Remove obstructions and provide ample side clearance
	Poor positioning of idler next to head pulley—too close or too high	Relocate or readjust idler or pulley position
	Too-sharp vertical curve	Cut down curve radius to reduce stresses on idlers and belt
	Mildew	Use inhibited belt
Lengthwise carcass break, top and bottom covers intact	Belt running off and folding back	Use limit switches
	Joining of impact breaks	Reduce impact
Shrinkage	Moisture	Splice in extra piece with takeup half down
Bowing up in center	Oil	Eliminate oil source or use oil-resistant belt. To relieve condition in existing belt, groove lengthwise with tire-grooving tool
Spot swelling	Oil	Avoid overlubrication and spillage of oil and grease
Blister in cover	Fine material working into cuts or punctures	Spot repair, vulcanizing or two-way dough
Fastener pull-out	Improper starting	Stepped starting
	Excess tension	See recommendations in "Troubleshooting Belt Operation"
	Improper fasteners or fasteners not properly tightened	Use correct fasteners. Retighten new fasteners after run-in. Inspect regularly
	Mildew	Use inhibited belt
Crosswise breaks back of fasteners	Fastener plates too long	Use shorter fasteners or increase pulley size, or both

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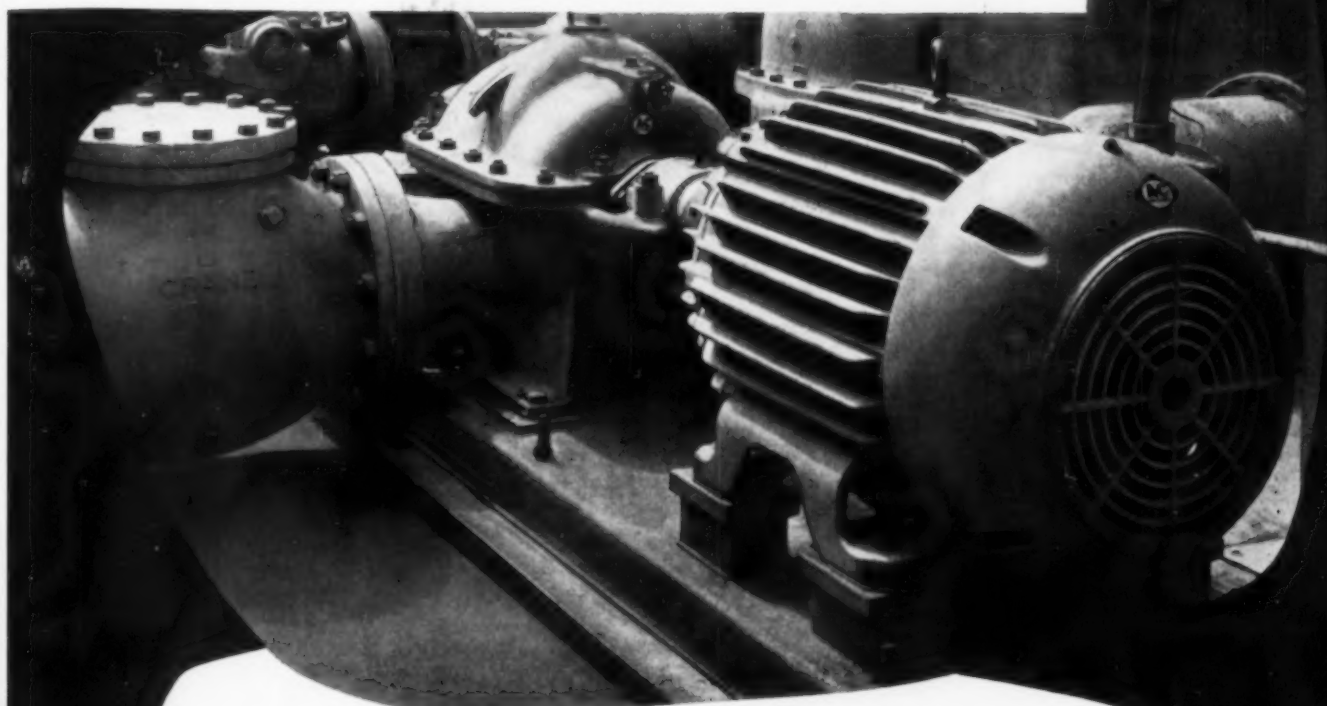
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long-run power by Allis-Chalmers



Want to reduce motor burnouts?

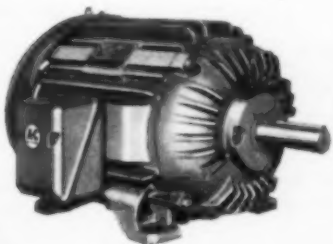
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- Ribbed cast-iron frame has large cooling surface. Protects against physical damage, too.
- Bearings are double-shielded type to control grease migration, prevent overgreasing — and grease *stays out* of motor interior.
- Lubricant may be changed without disman-

ting motor. New grease can be inserted, old grease flushed out via pipe-tapped holes in bearing housings.

- Double insulation makes stator electrically tough. Polyester film to guard windings in the slot, cambric strips to protect windings phase to phase, and multiple dips and bakes of insulating varnish do the job.

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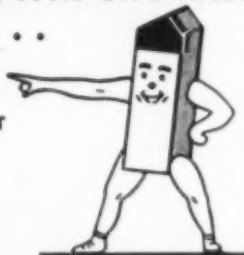
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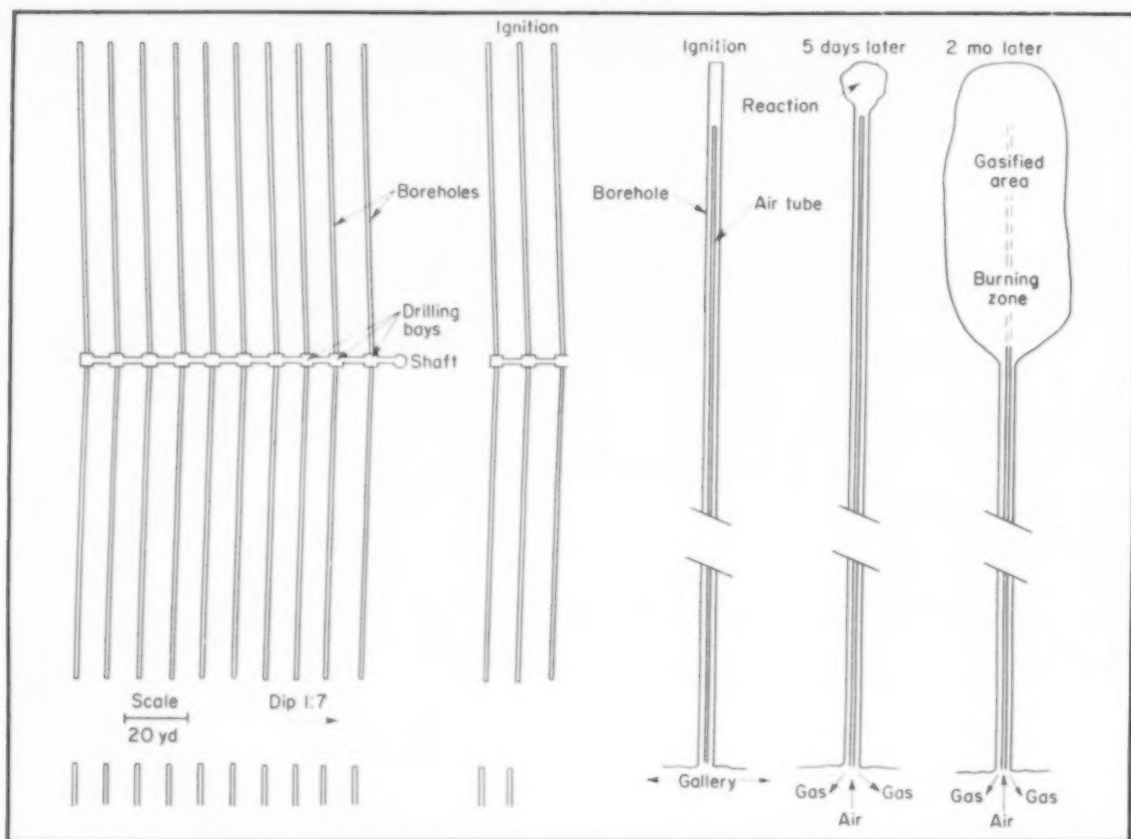
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BLIND BOREHOLE gasification plan has been fixed upon as the best for British purposes, and is being employed in the pilot installation. How gasification proceeds in an individual borehole is shown in the view at the right.

Underground Gasification . . . The British Program

Gasification of coal in place is regarded in Great Britain as an attractive possibility for increasing energy output to help meet rising demands. Research indicates that Btu's can be delivered to a mine-head electric-generating plant cheaper than coal to plants away from the mines.

USING the "blind borehole" technique, the National Coal Board of Great Britain, in cooperation with the Central Electricity Authority, is now constructing, at Newman

Spinney, a pilot-scale plant for the underground gasification of coal with the aim of developing a commercial process for early use. Under British conditions, it is expected that the cost of Btu's obtained by gasification, in the commercial stage, will be about half that of Btu's from coal for power-plant use.

Great Britain originated the idea of underground gasification (Sir William Siemens, 1868) and conducted the first experiments (Sir William Ramsey, 1912-13). The present program was initiated in 1949 by the Ministry of Fuel & Power, from which the National Coal Board took over in July, 1956. NCB in turn contracted with Humphreys & Glasgow, Ltd., for construction of the pilot-scale gasification plant, the conduct of the necessary further experimental and developmental work, and the preparation of designs for a commercial-scale plant at the appropriate time.

The need for increasing the availability of fuel and energy from domestic sources is the driving force behind the gasification project—and other projects designed to raise the output of all forms of energy. This need, it is forecast, will continue even after nuclear power becomes available on a broad scale, since all economic sources of energy, as in the United States, will be called upon to contribute to the utmost to meet rising demands.

Basic Approach

The first stage in Britain's underground gasification program ended with the mid-1956 takeover by NCB. Up to that time, some 50 trials had been conducted in six seams, several of them unminable. One site was Bayton; the other, Newman Spinney. Over 5,000 long tons of coal were gasified at an experimental cost of £¾ million.

The original aim in underground gasification in Great Britain was a system under which all work would be done from the surface in nearly horizontal seams. Boreholes from the surface were linked by both pressure and electricity, but the results were too erratic for commercial application. In 1953, therefore, it was decided to modify the standards to permit the preparatory work to be done underground.

The plan for a gasification section at Newman Spinney is shown in an accompanying illustration. The opening from the surface is a concrete-lined shaft 8 ft in diameter. From this shaft a gallery 100 yd long will be driven into the seam. Holes 10 yd long will be drilled at 10-yd intervals from each side of the gallery, the 20 holes covering an area of approximately 20,000 sq yd.

Gasifying the Coal

The layout of a single borehole, in various stages of gasification, is shown diagrammatically in a second accompanying illustration. Other illustrations show an experimental directional-drilling rig and a reamer for enlarging the hole to the desired diameter. To date, it has been possible to drill 600 ft deep and prepare holes more than 12 in in diameter by reaming.

In the first experiment to involve burning several boreholes, the diameter of the holes is to be 12½ in. The pipe carrying the combustion air to the reaction area in each hole will be 4 in in diameter and will be made up of short lengths of high-chrome cast iron. The inby 70 ft will be protected by refractory piping to withstand the high temperatures encountered in the early stages of burning.

Air will be forced down to the boreholes through a shaft column and header in the gallery. It will return through the gallery and the shaft, the latter being equipped with a suitable offtake cap. Sprays in the gallery and shaft will cool the gas.

Piping has been and still is the subject of investigation, including "trench tests" on the surface. These consist of putting about 20 tons of coal in a trench, placing the pipe to be tested therein and igniting the coal, which burns for about five days. The aim is the most economical type for use in the holes.

Gasification Results

The first of the multiple-borehole pilot sections is ex-



DIRECTIONAL DRILLING of holes more than 300 ft deep is one key to gasification with blind boreholes. This illustration shows an experimental rig at work.

pected to start producing gas in December, 1958. It will demonstrate, among other things, whether operating a number of holes together will result in erratic, or "run-away," burning and if so will provide an opportunity to test remedial measures and equipment.

Air will be fed to each borehole at a pressure of about 10 psi, and at a rate of around 25,000 cfh. Ignition in each hole is accomplished by a suitable source and the flame is fed by propane or other suitable gas until burning is established.

The capacity of the pilot power plant to use the Newman Spinney gas is 5,000 kw. Plans call for gasifying two sections at the start, each containing about 20,000 long tons of coal each. Two sections together, it is expected, will provide the desired gas output—about 1,000,000 cfh. They are expected to last about 6 mo in continuous operation. The gas will be burned under a boiler to provide steam for a conventional turbo-generator.

Using air, the heat value of the gas from blind boreholes varies from 70 to 100 Btu per cu ft.

For a full-scale 60,000-kw plant with a load factor of 50%, it is calculated that about 250,000 long tons of coal would have to be gasified per year. If the total life was 30 yr, about 2½ sq mi of 30-in coal would be required, each square mile possibly requiring 13 shafts about 400 ft deep.

Calculations by C. A. Masterman, formerly technical director, underground gasification, Ministry of Fuel & Power, and now with Humphreys & Glasgow, indicate that as of 1962 gas could be produced with air at about 1¾d per therm, and perhaps lower. This compares with about 4d for coal at the present time and 2½d for the years 1949-50.

At 1¾d per therm, also, the cost of electricity from gas would be about 0.4d per kilowatt-hour, base load, against 0.6d for nuclear stations. In addition, possibilities exist for reducing the gas price substantially through improvements in technique as a result of experience on a larger scale.

Allis-Chalmers TS-160

7 yd struck

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155 horsepower

5 speeds to 25.4 mph

12-ton payload



Measure these advantages for

22 hp per struck yard—Big Allis-Chalmers supercharged diesel engine delivers extra lugging ability for tough pulls, fast loading. Versatile TS-160 can team up with big equipment or work alone on long- or short-haul construction jobs—handle a wide range of utility jobs, travel at speeds up to 25.4 mph.



19,304 LB RIMPULL

Measure these features . . . Allis-Chalmers 516-cu-in. diesel engine—dependable power at all working speeds • Independent, constant live hydraulic power for steering and scraper operation • Low, wide bowl—8-ft, 1½-in. cutting edge . . . 3-piece, interchangeable cutting edges . . . double-acting hydraulic bowl lift jacks • Positive hydraulic ejection, high apron lift to full 7-ft, 1½-in. opening • Roomy operator's compartment, easy-to-reach controls, 24-volt direct electric starting, adjustable bucket-type seat, synchronized 4-wheel air brakes • Big push block for all types of pushers.



a wide range of earth-moving jobs...

Turns non-stop in less than 25 ft with 90-degree hydraulic steering... easy maneuverability in narrow cuts, faster cycles without reversing in tight turn-arounds.

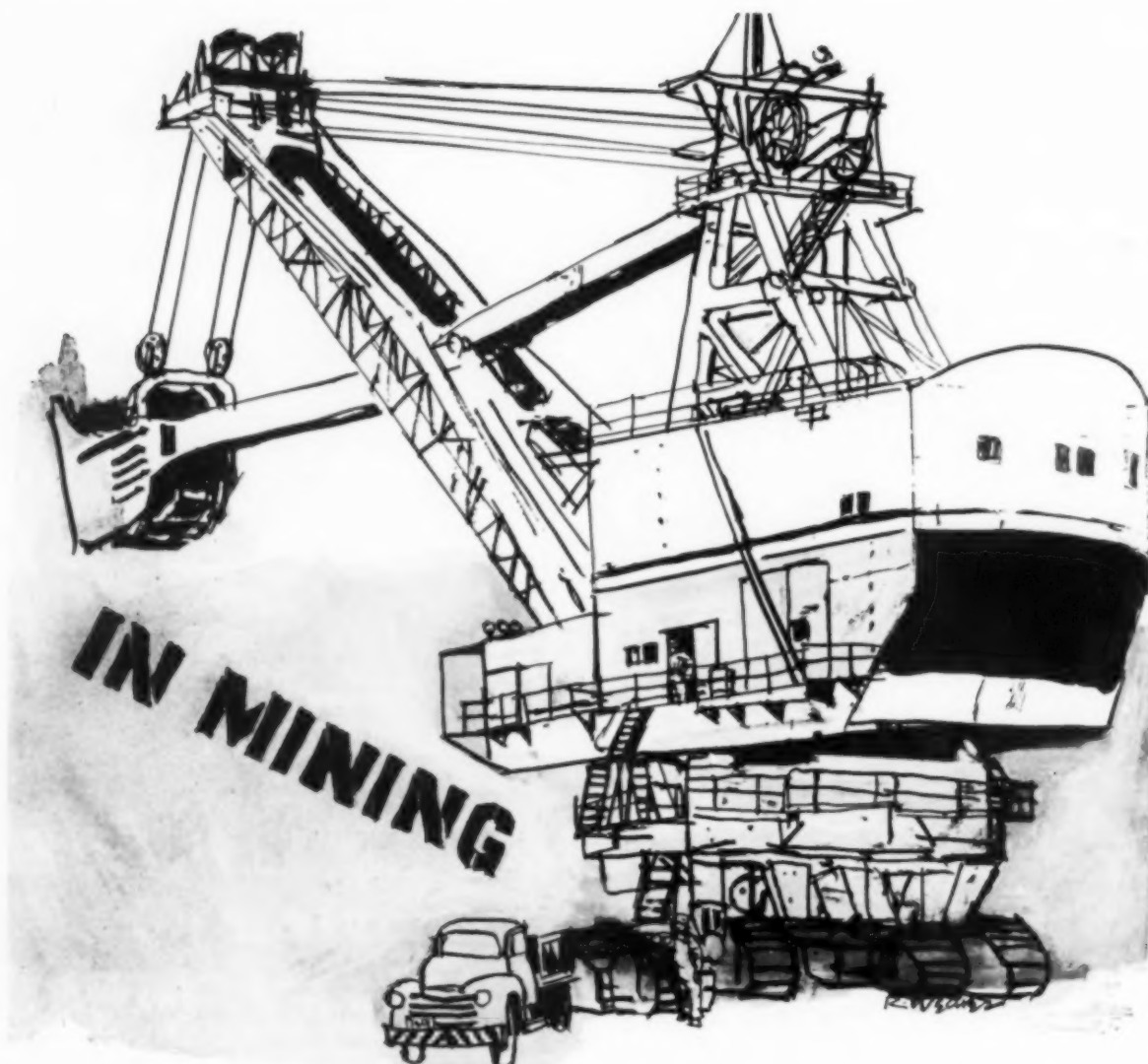
Moves quickly from job to job... when required, transport wheels are available to meet legal load limits for highway travel.



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NOTHING TRANSMITS POWER AT SUCH LOW COST FOR SO LONG AS ROEBLING ROYAL BLUE WIRE ROPE. No means of transmitting power can be compared—on a cost basis—with Royal Blue, the strongest wire rope you've ever used. Meeting stringent service demands is a function fulfilled by Royal Blue in many ways: unimpaired flexibility, great resistance to shock, abrasion and impact—a plurality of qualities that make for singularly long service life. For further details on "length through strength," communicate with Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.



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Test Your Tax I. Q.

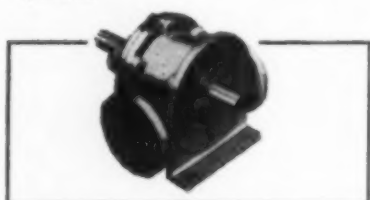
"T," meaning "Tax" day is coming. Do you know all that you should about what you can claim and what you cannot? To test your knowledge and at the same time provide some help, this quiz has been prepared by the American Institute of Certified Public Accountants in cooperation with the Internal Revenue Service. See p 133 for the correct answers.

1. During the past year you spent approximately \$1,000 for built-in bookcases and wall-to-wall carpeting for your office. Since your lease has only 4 yrs to run, you may . . .
 - ☐ A. Deduct the \$1,000 on your 1957 tax return.
 - ☐ B. Amortize the cost over the next four years.
 - ☐ C. Depreciate it over the life of the furnishings.
2. When you were transferred to another city, your company gave you a sum of money toward the cost of moving you and your family. For tax purposes you should consider this money as . . .
 - ☐ A. A gift that is not taxable.
 - ☐ B. Income that is subject to tax with a deduction for only your personal moving expenses.
 - ☐ C. Income that is subject to tax with a deduction for the cost of moving your entire family.
3. You have invested in several blue-chip stocks. The dividends received from this investment are exempt up to . . .
 - ☐ A. \$50 whether you or your wife owns the stock.
 - ☐ B. \$100 if the stock is held jointly by you and your wife.
 - ☐ C. \$100 regardless of who owns the stock, providing you file a joint return with your wife.
4. You are *not* permitted to deduct as contributions your donations to which of the following organizations . . .
 - ☐ A. Charitable societies.
 - ☐ B. Educational institutions.
 - ☐ C. Political parties.
5. Your daughter, who was hospitalized for several weeks in the earlier part of 1957, was married in November. If she files a joint return with her husband, you may . . .
 - ☐ A. Not claim her as a dependent but you may deduct her medical expenses.
 - ☐ B. Claim her as a dependent and deduct her medical expenses.
 - ☐ C. Not claim her as a dependent and you may not deduct her medical expenses.
6. You filled very few inside straights during the past few months and lost approximately \$300 to the members of your Thursday-night poker club. You should . . .
 - ☐ A. Deduct the loss in computing adjusted gross income.
 - ☐ B. Subtract the loss from adjusted gross income.
 - ☐ C. Give up poker and start watching television on Thursday nights.
7. Last October your car skidded on a wet road and grazed a telephone pole. The damage was not covered by insurance and it cost you \$100 to have the car repaired. To claim a casualty deduction . . .
 - ☐ A. You must have the damage repaired within 30 days of the accident.
 - ☐ B. You may simply deduct the amount of the repair bill.
 - ☐ C. You must prove that you were using the car in your work at the time of the accident.
8. Which of the following may you *not* consider as a deductible business expense . . .
 - ☐ A. A subscription to *Coal Age*.
 - ☐ B. Commutation fees.
 - ☐ C. The cost of attending the Coal Show.
9. While playing hide-and-seek in your backyard, the neighbor's children trampled and killed several of your more expensive bushes. The cost of replacing this shrubbery . . .
 - ☐ A. May be deducted if it does not exceed the original cost of the bushes.
 - ☐ B. May be deducted only if the parents of the children refuse to pay damages.
 - ☐ C. May not be deducted under any circumstances.
10. Your 16-yr-old son works during the summer for you in your unincorporated business, and you pay him a weekly salary. Since he is a full-time employee, he is . . .
 - ☐ A. Required to pay social security.
 - ☐ B. Not subject to social security.
 - ☐ C. Permitted to decide whether he does or does not want social-security coverage.
11. Last year you gave your church a small piece of property for which you had paid \$500 some time ago. Its value at the time of the gift was \$1,500. As a result . . .
 - ☐ A. You may claim a tax deduction of \$1,500.
 - ☐ B. You must pay a capital gains tax on the \$1,000 increase.
 - ☐ C. You may claim a tax deduction of \$500.
12. There were a few leaks in the shingle roof of your office building, so you constructed a new tile roof. You should . . .
 - ☐ A. Consider this as a repair bill and deduct the entire amount as a business expense on your 1957 return.
 - ☐ B. Regard this as a capital improvement and depreciate the cost over a period of years.
 - ☐ C. Add the cost of the repair to the value of the property.
13. After you have filed your personal 1957 tax return, the government is allowed to check your return and bill you for additional tax. The period of time in which this may be done ends . . .
 - ☐ A. On the day you file your 1958 return.
 - ☐ B. Two years after you file your 1957 return.
 - ☐ C. Three years from the due date of your 1957 return.

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Gathering Type PLUNGER PUMP—dependable, light, compact. Has many uses. Pipe connections are brought into proper position by reversing suction and discharge chambers. 42" long, 17" wide, 22" high, weight (less motor) 260 pounds.



High Pressure SPRAY or FIRE PUMP—round stainless steel rollers prevent clogging and jamming by coal and dirt particles. Uses less power—friction is reduced. Produced in various capacities—10 GPM at 100-125 PSI for spraying, 50 GPM at 50 PSI for fire needs.



CENTRIFUGAL PUMPS highly rated for complete reliability and service. All sizes to 8" discharge and 1500 GPM. In acid-resisting bronze or stainless steel.

PUMP REPLACEMENT PARTS for practically all types and makes of centrifugal and plunger pumps.

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JOHNSTOWN, PA.

Sales Agent: Kanawha Rail & Machinery Co.,
Charleston, W. Va.

Your Tax- Quiz Answers

1. B. On leased property, you normally spread the cost of improvements over the shorter period—the life of the improvement or the term of the lease. Since your lease expires in 4 yrs and presumably the furnishings will have a longer life than that, you should be able to claim a \$250 deduction on your federal tax return for this year and the next 3 yr.
2. C. The money you received from the company must be reported as income, but you may deduct the cost of moving your entire family. If the amount the company gives you exceeds your expenses, the excess is taxable. Conversely, however, if your expenses were more than the amount received, the difference is not deductible.
3. A and B are both correct. All taxpayers are entitled to a \$50 dividend exemption. A husband and wife can combine their exemptions and receive \$100 in dividends tax free, providing the stock is jointly owned. The filing of a joint return will not qualify them for this double exemption if the stock is held in only one of their names.
4. C. You cannot deduct contributions to an organization which spends a substantial part of its time lobbying or distributing political propaganda.
5. A. You gained a son-in-law but lost a \$600 dependency exemption for 1957 when your daughter married in November. All is not lost, however. If you provided more than one-half of your daughter's support during the year, you may claim her medical expenses as a deduction on your return.
6. C. Watching television can be most relaxing and it might even help you to forget your poker losses—which is the thing to do because net gambling losses definitely are not deductible. Net gambling gains are taxable as income, so if you won money in a football pool or other sources, you may use your poker losses to offset these gains.
7. B. The IRS has ruled that "if the repairs do nothing more than re-store the property to its condition immediately before the casualty and do not add to (its) value, utility or useful life, such repair costs may be used as a measure of the value of the destroyed portion." Where you were going at the time of the accident does not affect the deductibility.
8. B. Commutation fees are not a deductible business expense. The cost of going to and returning from work, whether it be by bus, cab, train or plane, is not deductible since it is a personal expense. On the other hand, A and C are deductible.
9. C. Damage to your shrubbery caused by children, dogs or errant lawnmowers is not deductible. If your home or lawn is damaged by fire, storm or flood, the loss not covered by insurance may be deducted. When large amounts are involved it is wise to have an expert appraisal made immediately after the casualty.
10. B. Since your son works for you, you are not supposed to pay social security tax on his wages, nor is he required to make contributions. If your business is incorporated, however, the corporation must pay social-security tax on his salary.
11. A. Your deduction for a charitable contribution is the value of the gift at the time it is made. You are not considered to have realized a taxable gain or deductible loss when you give property away. You may claim a deduction for the entire \$1,500 so long as this amount does not exceed 20% (30% in some cases) of your adjusted gross income.
12. B. The roof is considered an improvement, not an ordinary repair. The cost of replacing the roof is deductible as depreciation spread over its estimated useful life.
13. C. In the absence of fraud or substantial understatement of income, the Government has 3 yrs from the due date of your 1957 return to check your return and bill you for additional tax. Since the due date of most individual returns is April 15, and for investigation purposes all returns are treated as though filed on the due date, you should be sure to save all check stubs and receipted bills to prove your declared deductions until April 15, 1961.



Steel changes for the S-12V stopers are 24, 30, and 36 inches long. Overall stoper heights are 37, 43, and 49 inches.

Large openings and high vacuum make the Vac-Nu-Matic dust box equally efficient at removing dry or wet cuttings.



Right: The new S-12V Vac-Nu-Matic fills the need for a heavier dust-collecting stoper to speed up roof-bolting operations which are so essential to continuous coal mining.



New Le Roi Dust-Collecting Stoper Speeds Drilling in Hard Top Formations

S-12V stoper features popular Vac-Nu-Matic® dust collection system.

Enables miners to increase drilling footage with less effort.

The new Le Roi S-12V Vac-Nu-Matic stoper combines greater heft, more power, and positive "through-the-drill-steel" dust collection — for faster, dustless drilling of roof-bolt holes in hard top formations.

Its powerful piston impact, free-cutting bits, and powerful rotation assure faster penetration—eliminate stuck steel. The stoper's heavier construction is balanced for easy handling—enables the operator to work more efficiently and in greater safety.

Le Roi's Vac-Nu-Matic dust-collec-

tion system is an integral part of the stoper. Since no additional equipment is needed, the S-12V reduces set-up time and can be moved easily to any part of the mine.

Positive Dust Collection

All system components are specially designed to assure positive dust collection throughout the entire drilling cycle. This integrated design keeps dust count in the drilling area well below the approved Bureau of Mines standards.

What's more, the S-12V can be used with two types of bits to cope with changing seam structures. The Vac-Nu-Matic bit is best suited for soft formations, while the 5-hole CRD bit is recommended for medium to extremely hard top structures.

A touch of the operator's finger-tip provides finely graduated feed-pres-

sure control to meet varying requirements. Constant blowing at the chuck keeps cuttings out of drilling mechanism, assuring long, trouble-free service. Other features include socket-type sliding chuck, end-seating automatic valve, positive pressure in both directions, and short stroke.

Feeds and Weights

The new S-12V stopers are available with 28-, 34-, and 40-inch feed legs, and weigh 105, 110, and 115 lbs. respectively. All are adaptable for hand-held operation or jumbo mounting.

Write today for information on the new stopers. Also ask about the new dust-collecting conversion kits that Le Roi offers to change older S-11 and S-12 stopers to cost-saving Vac-Nu-Matic dust collection.

"Vac Nu-Matic" is the registered trademark for Le Roi's dust collecting stopers, bits, and dust boxes.



LE ROI

Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Newmatic air tools, portable and Tractair® air compressors, stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.



How Research Shapes Our Future Prosperity

If you are looking for an industry that is going to keep on booming in 1958 and every year for the next decade, here it is. It is the industry of technological innovation through research and development.

Last year this great new industry spent over \$7 billion to discover and develop new industrial products, processes and equipment. This year the preliminary McGraw-Hill survey indicates that total expenditures for industrial research and development will be even greater, perhaps as much as \$8 billion. Of the companies surveyed, 57% plan to spend as much as in 1957 and 38% plan to spend more.

The sustained expansion in research and development is the best guarantee we have that the current decline in business investment in new plants and equipment will be relatively short-lived. There can be no prolonged decline in investment in an economy where technology is changing rapidly.

This editorial is designed to show how the continued surge in research and development can be expected to lead first to new products, and eventually to renewed expansion of investment in new industrial plants and equipment. Such expansion is the essence of national economic growth.

A Slow Start

The impact of research on sales and investment is still very gradual. Research spending itself has more than doubled in the last four years. But only 32% of all manufacturing firms report significant capital outlays to make new products. We are not reaping the full dividends of industrial research as yet for several reasons:

- Research expenditures were relatively small until the Korean War of 1950 brought substantial government contracts in aviation, electronic and related fields. Heavy research outlays for civilian and industrial products came even later.

- There is an average *lag*, according to research directors consulted by the McGraw-Hill Department of Economics, of roughly seven years from the start of research until the product is ready for large scale output — about five years of research and at least two years to solve production problems and develop markets.

- Complex products, such as new consumer durables and industrial machinery, have an even longer time lag.

However, new developments are certainly underway. Research began to increase in all lines of business when Korean War restrictions and

the excess profits tax came to an end in 1953. The tax revision of 1954 added a new incentive by making research outlays deductible as a current business expense. By 1955, the research boom was on.

When Is The Payoff?

With a lag of about seven years, it will be the early 1960s before these new developments become a dominant factor in capital investment. But once the flow of new products and new processes starts, it will accelerate sharply — just as research spending has accelerated in the past few years.

By 1960, over \$50 billion in sales will be coming from products not on the market as recently as 1956. Sales of new products will increase year by year, but they will gain most in 1960-1962, or five years after the recent spurt in research expenditures.

Capital expenditures to manufacture new products will also rise, but with a slightly longer lag. Here the sharpest rise should come in 1962-1965, as the new products reach a volume that calls for a significant amount of new capacity. In most cases, initial output of new products will come from existing capacity.

This timing of a new wave in capital investment appears logical on other grounds. Population experts forecast an upsurge in marriages and births around 1965. So by 1962, industry will be starting to tool up for new mass markets.

The important point is this: As we approach the 1960s more and more sales and investment will be in new products growing out of research. By 1960 well over 10% of manufacturing sales will be in new products not on the market in 1956.

Meanwhile — research will help stabilize capital spending by raising the level of modernization and replacement expenditures. Of course, research does not eliminate all the ups and downs in the demand for capital goods, for there remain variations in the amount spent to expand capacity. But a high level of modernization, to cut costs and improve quality, does put a floor under any drop in investment.

What To Expect

During the next few years we can expect an increasing flow of new materials, new metallic alloys, new machinery — primarily those developments coming out of long-established research programs in the chemical and electrical industries. Industry will make wider use of specialized computers and automated equipment.

But the dramatic payoff on research comes even later. In the early 1960s the consumer goods industries will begin tooling up for their really new products — things so basically new they can change the way a family lives. Such items as plastic houses, paper apparel, turbine autos are under development right now. But it will take several years to get costs down and for population and incomes to grow to the point where mass markets are created.

When we reach that point in the mid-1960s, there will begin the greatest surge of capital investment in all history. And then — around 1965 — the new processes (full automation, atomic power, continuous steel casting) which are the slowest and most expensive part of the research chain to develop, will come into play.

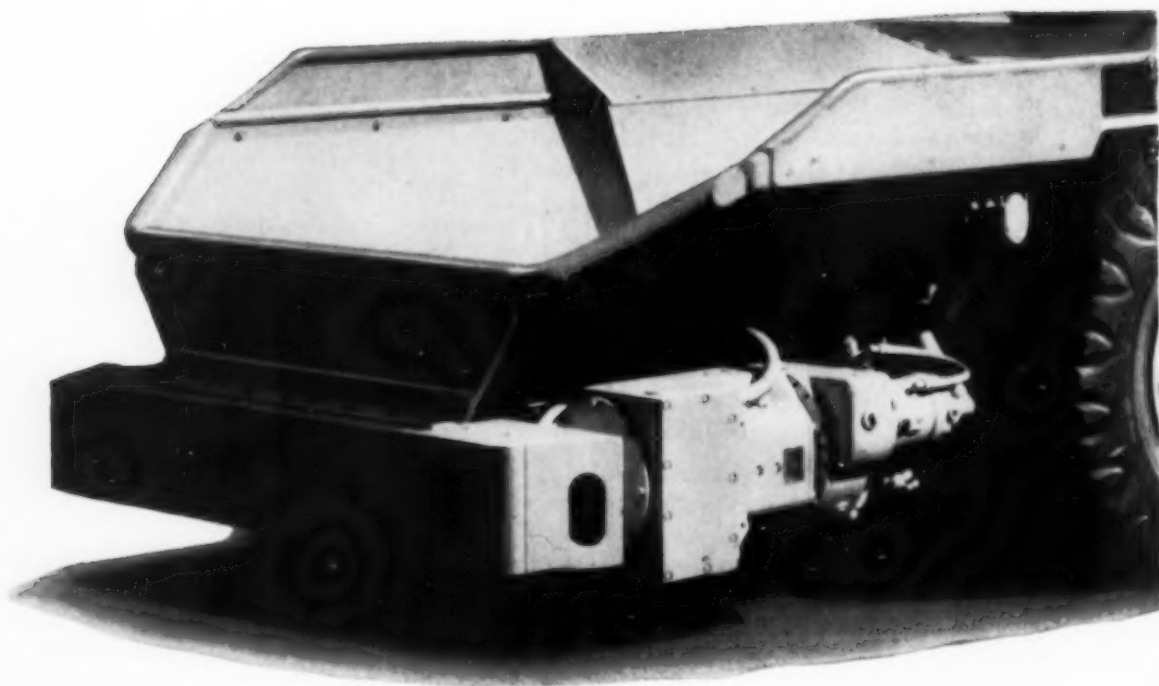
The combined impact of new products and new processes, to meet an expanding market, will thus be felt in the mid-1960s — eight to ten years after the recent sharp increase in research spending. The full impact is that far away because of the lags for applied research, pilot plant studies and market introduction. But to a large degree the prosperity of the 1960s has already been shaped by the research programs now underway.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw
PRESIDENT

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Progression of power on a Jeffrey shuttle car is s-m-o-o-t-h. *So smooth you can't feel it shift.* There's no jerk as the motors are shifted from "low" to "high". Control is simple, too, since it's automatic.

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Payloads can be matched to your mining height, ranging from 4.6 tons to 9.2 tons; 88" or 96" wide. Fast loading and unloading are easy for the operator as he has the aid of the variable speed, hydraulically driven discharge conveyor. Can be reversed instantly to clear jammed lumps.

Jeffrey shuttle cars are highly maneuverable: four-wheel drive with no-slip differential between wheels on the same axle...four-wheel steering...four-wheel disc type hydraulic brakes...full magnetic, progressive series-parallel acceleration with hand-selection series position.



Foremen's Forum



CLEAR, COMPLETE INSTRUCTIONS, a check on the assignee's understanding of the task to be done, and diligent follow-through are important elements in issuing work orders.

Giving Better Work Orders

Daily tasks in modern coal mining are more complicated than they used to be. If you want a job done right the first time, give more thought to preparing work orders for your man.

By Ernest W. Fair
Boulder, Colo.

"IT'S NOT LIKE THE OLD DAYS. Then you told a man to do something and he did it. Now you never know whether your order will be carried out or not."

This comment hits the spot today for those executives or supervisors who give little thought or planning to the process of order giving. When such forethought is given, the man receiving the order usually carries out his assignment with accuracy and dispatch. Too often these situations arise because we have attached little importance to the process of giving orders. Working conditions today differ greatly from those in the past. Nor can we now afford the luxury of inaccuracy or inefficiency in carrying out assignments. The costs of mistakes are too great.

Smooth, successful order-giving is not difficult. It is a matter of applying attention to detail and learning to follow some definite time proven steps. Here they are:

Prepare the order in advance. This

takes but a few moments, and after a little practice it becomes routine. In your preparation consider the following three points.

1. Have a definite objective. Assignments or orders which have an indefinite goal are seldom accomplished with any degree of efficiency. When we know the objective it is an easy matter to pass it along as part of the assignment.

2. Establish the right direction. Very often the supervisor knows the direction of attack when he gives an order. Seldom does the individual receiving the order know about this. Setting the direction is important to him.

3. Be sure of its practicality. Any assignment that is touched with the slightest degree of impracticality is difficult for the recipient to accept. It is not worth the effort required to carry out the order successfully.

The second major step in the process of smooth assignment giving is in making certain that we have selected the right individual to carry out the order. The success of any assignment often will depend almost entirely upon this, for individuals possess different experiences

and abilities. For maximum performance on an assignment, make sure you have selected the best possible person to do the job.

Experienced supervisors have found that the surest method of selecting the right person for an assignment is to make certain of these points:

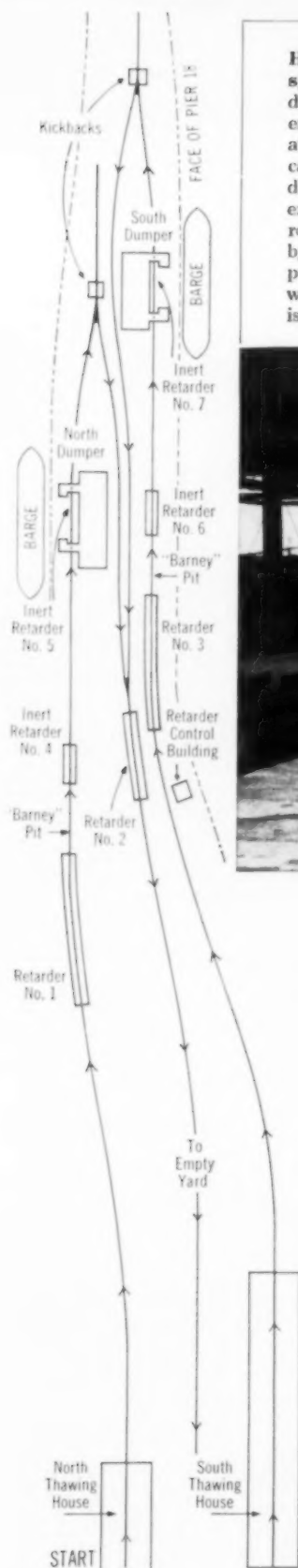
Who is capable of the best performance? In this respect it is necessary to be fully acquainted with the abilities of each individual in the crew.

It is also important that one person not be made the "work-horse" of the staff. The willing man soon gets tired of carrying more than his share of the load, and an unpleasant situation may arise among the remainder of the staff.

It is good procedure also to assign an individual to do a certain job rather than to generalize an assignment. And when the person is selected, take a moment to tell him why he was selected. This is particularly important on major projects or assignments.

There is no set formula for proper delivery of orders and assignments. What is right and proper in one situation may be improper in another. However, there are certain points which should always be kept in mind.

One of these is to take time to see the procedure through the eyes of the individual receiving the assignment. It is also of utmost importance that the supervisor be certain of the clarity of every



How the new UNION car-retarder system works — Pier 18 has two coal dumping systems and both use the same empty yard. Following through the operation of the North dumper, a loaded coal car leaves the North thawing house, rolls down an incline to retarder No. 1 where its exit speed is reduced, so that when the car rolls on to the "barney" pit, it is stopped by inert retarder No. 4. A "barney" then pushes the car up the slope to the dumper where it is stopped by retarder No. 5. Coal is then dumped into a barge.

The next full car pushes the empty car off the dumper. It goes by gravity through a kickback and spring-switch combination for return through retarder No. 2 to the empty yard. Controls for the power retarders and switches are incorporated in a control machine housed in a new tower building. One operator in this tower surveys the operation and operates the control machine. He has loudspeaker communication with the thawing sheds, the control cabins on the dumpers, and the yard office.



General view of North and South dumpers showing No. 2 and 3 retarders in foreground. Car entering retarder is going to the empty yard.

Fast, low-cost coal handling results from Automation at Pier 18

The Central Railroad of New Jersey recently modernized its coal dumping facilities at Pier 18, Jersey City, N. J. Now, one man sits in a tower, flicks a few levers, and controls loaded coal cars rolling by gravity to the dumpers and empty cars moving from the dumper to the empty yard. Formerly, this job required a crew of car riders and was a costly and hazardous operation.

Now, the job is handled quickly, safely and economically through a

system of UNION Electro-Pneumatic Car Retarders. Operating costs have been greatly reduced, and coal is promptly loaded for shipment by barge to New York and New England areas.

What is your materials handling problem? If it involves many carloads of coal, ore or other products, let us show you what can be done with automatic car-retarder systems to increase efficiency and reduce costs. Write for information.

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Foremen's Forum (Continued)

order he gives. Do not take the other fellow's knowledge of the problem for granted, no matter how many times he has done the job in the past.

You should also be sure that the individual is thoroughly familiar with the terminology, that he has the required background for the job, and that he has all the necessary facts.

One sure way of being certain of this is to have the staff member repeat the instructions given him. This is best done through informal discussion for a moment or two when the order is given, rather than a request for a direct repeat. The latter may not be received

in good spirit by the average person.

Understanding also comes easier when orders are dispensed in "bite size" portions rather than in one big flow of instructions. Any involved order needs such a breakdown because a man can easily be "snowed under" unless he is given the opportunity to digest the assignment piece-by-piece.

Basing an order on an advanced understanding of the staff member's judgment, initiative, training and experience is also good procedure. This may call for a little more effort in understanding every individual on the staff, but it pays

off very handsomely in getting assignments carried out properly.

Our own attitude in giving orders and assignments is also important. When we make certain that each such instruction is given clearly, as calmly as we can and with great self-confidence our chances of giving successful orders increases.

It is also important to make certain that responsibility is pinned down when every assignment is given. Insisting on follow-through on the assignment is necessary. And checking progress and requiring reports on assignments which take any length of time are also important.

Seven Attributes of a Successful Supervisor

THE SEVEN POINTS listed below were expressed as personal characteristics of L. C. Campbell, at a dinner held in Mr. Campbell's honor upon his recent retirement as vice president of Eastern Gas & Fuel Associates. The apt description was presented by W. J. B. Mayo, division manager of Eastern Gas & Fuel. We present the seven points here for the double purpose of (1) seconding Mr. Mayo's thoughtful appreciation of Mr. Campbell's personal attributes and (2) recommending them to your thoughtful analysis.

"1. **Tact.** Webster describes tact as a quick or intuitive appreciation of what is fit, proper, or right; fine or ready mental discernment shown in saying or doing the proper thing, or especially in avoiding what would offend or disturb; skill or facility in dealing with men or emergencies.

"2. **Tolerance.** It has been said that a wise leader is indeed a tolerant one who keeps his mind open so that other people's viewpoints may be considered, thus making it possible to make the best decisions not only for a business enterprise, but also for the good of all connected with it.

"3. **Adaptability.** During the past two decades technology in bituminous mining has been progressing constantly. This has necessitated many changes through which many of us have gone. The ordinary revolt against new methods, and new ideas has been minimized through patience and tolerance as a result of good leadership.

"4. **Self-Discipline.** This is one of man's prime requisites in order to guide, direct and lead others. It demands constant analysis of our mental faculties to

tell others in words how and when to start the job without any sign of emotional or nervous tension on the part of the individual issuing directives.

"5. **Constructive Criticism.** The ability to give and accept constructive criticism is a most important factor in the operational end of any business. The manner in which constructive criticism is given is as important as the necessity for having an open mind to receive it. Constructive criticism should be given in a

sincere and friendly manner and when this is done, the open mind will receive it in friendly and sincere fashion.

"6. **Getting Started.** You must have a plan before it can be executed. When the plan is finally resolved, it is easy to delay the job of getting started. Two other elements are necessary to activate a plan—inspiration to get going. So it is necessary to swing into action and get the project started.

"7. **Confidence.** Place our reliance or trust upon ourselves as well as others. Like faith, it plays a most vital part in man's affairs. Confidence in the person directing the project as well as in ourselves is a good start in accomplishing more than signal success, even in a job considered totally experimental."

USnik in Orbit! What Now?

THE BIG NEWS out of Cape Canaveral tells of the successful launching of our first earth satellite. As this is written, Explorer is circling high and handsome, sending out a signal that must be reassuring to all Americans. But we have had our bad moments in the past few months. Our complacency was shaken to the taproot when the Russians lofted a pup in Sputnik II to bark in space at Sputnik I.

Shall we now relax into our complacency, secure in the knowledge that we can put them up there too? Perish the thought. There is other disquieting news that should serve to keep us loose and shifty. We are on the way to becoming the softest nation in the world, judging from the physical fitness and stamina of our youngsters. Here are the shocking facts revealed in a study of the situation:

58% of the United States children who were tested failed in one or more of six tests for muscular strength and flexibility, while only 9% of the Euro-

pean children who were tested failed.

44% in the United States failed in the one flexibility test (of back muscles) included in the six tests, against only 8% of the European children.

36% of the United States children failed in one or more of the five strength tests, compared with only 1% in Europe. Three of these tests measured the power of abdominal muscles, and two the power of back muscles.

The next time you see your lad hypnotized into immobility by a 21-in tube, for hours on end, put him to work doing pushups. He can still watch TV if his form is good. Let's convince the kids to do less watching and more participating. They ride on airfoam cushions to many places that can be reached just as well by walking.

We in this country have provided excellent nutrition and all the necessary vitamins; now let's do what we can to develop stamina in the children—and in ourselves, too.

Check these
three points
on the
Oliver
Horizontal
Filter
for coal
dewatering

Capacity — Provides exceptionally high, continuous dewatering capacity at minimum floor space per ton handled . . . no degradation.

Range — Inherent design characteristics permit handling of wide size range from $\frac{1}{2}$ inch to 0 mesh. First, coarse sizes are applied to form bed; then, fine coal including cyclone underflow is added.

Low Cost — Initial and operating . . . utilization of gravity means improved filtration efficiency . . . simple, rugged design requires little maintenance. There are no high-speed moving parts.

If you have a coal dewatering problem, chances are application of the Oliver Horizontal Filter can solve them. For more complete information, write for Bulletin No. 7201. Dorr-Oliver Incorporated, Stamford, Connecticut.



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Operating Ideas



LOW-COST NEUTRALIZING of acid water in isolated areas is achieved with portable unit operating 2 to 8 hr without refilling the lime hopper.

Water-Powered Device Treats Acid Water Automatically

THE PROBLEM of low-cost neutralizing of acid water in isolated areas around strip pits has been solved at the Tasa Coal Co.'s Bortz mine, Wesley, Pa. A new automatic lime-feeding device requiring no power other than the water itself keeps water treating costs to a minimum.

Eleven Letts Autolimers, strategically located at small flows of acid water around the Bortz property, feed hydrated lime to the acid water before it flows to the streams. Employing an unusual feeding mechanism, the Autolimer overcomes the difficulty of feeding hydrated lime without a power-operated device. The new unit is manufactured by the Shirley Machine Co., Pittsburgh, Pa.

Other features of the Autolimer include operation by as little as a 1½-ft fall of the water being treated; functioning on 5 gph or less; light enough to be carried to the site by men on foot if necessary; lime is automatically proportioned to the volume of water treated; quantity of lime feed can be varied ac-

cording to water acidity; operates 2 to 8 hrs without refilling, depending on acidity.

Weighing 360 lb, the lime feeder measures 18 in wide, 48 in long and 58 in high. All parts that come in contact with acid water are made of stainless steel. The lime hopper has a capacity of 100 lb and lime can be fed to acid water at rates from 0 to 40 lb per hour.

Installing the Limer

There are four major items that must be considered in setting up the liming unit. They are as follows:

1. Chose a location where the acid water to be treated has several feet of fall.
2. Connect the pool of untreated water to the Autolimer with a small flume or section of 2-in pipe.
3. Provide a downgrade ditch from the discharge end of the treating machine. A rough, irregular ditch imparts a mixing action to the lime and water. But a wooden trough with alternately stag-

gered baffles is best for the discharge because it more thoroughly mixes the water and lime. A small hole in the earth downstream from the discharge point also is desirable to help mix the lime and water.

Since the flow and motion of water through the Autolimer is generally continuous, freezing is not usually a problem. But if near-freezing temperatures are encountered, the unit can be packed in sawdust or straw up to the top of the water tank. This will usually protect against freezing to quite low temperatures.

How it Works

With the Autolimer set up and charged with 100 lb of lime, the admission of untreated water starts and continues the cycle of operation. The operating cycle is as follows:

When the unit is empty, the float assembly that initiates the lime feeding is in the extreme low position. The water-discharge valve is closed under spring pressure. As water enters, the float rises.

Cams attached to a push-rod assembly which is operated by the float move up and contact rollers on a striker assembly. As the float continues to rise, the striker is swung back and forth. When the float reaches a predetermined height, the striker swings down and delivers a blow to the feeder plate. The blow discharges a small quantity of lime from the end of the feeder plate. The small quantity of lime drops to the discharge trough near the front of the Autolimer.

As the rising water causes the float to approach its upper limit, the water outlet valve is tripped open. The water rushes out into the discharge trough, picking up the charge of lime and mixing with it in the discharge ditch or baffled flume.

As the water level drops in the tank, the float lowers and when near the lower position it trips the water valve closed under spring pressure and the cycle repeats.

Adjusting the Unit

To handle the variations in acid content of the water and in the volume of water to be handled, several adjustments are provided on the device. These include changing of the inclination of the feeder plate opening and regulation of the intensity of the blow of the striker. Once the quantity of lime fed per cycle is regulated to neutralize the water in a cycle, changes in the volume passing through the Autolimer does not affect the operation.



AIR HOSE

Would you use this



for this?



Then why pay extra for heavyweight, muscle-bound air hose, when U.S. Rubber Air Hose is easier to handle, more flexible, and withstands higher working pressures...at lower end cost.

When you're on a tight budget and a tight schedule, there's no sense in throwing dollars away buying overweight, hard-to-handle air hose. Such hose—with excessive, unnecessary plies—is out of date, will slow you down, and leave you out of pocket.

Now, thanks to "U.S." engineering, you get the optimum balance in air hose—easier to handle *and* at the same time tougher and less expensive. What's more, U.S. Air Hose handles higher working pressures than

the conventional air hose you might be using.

Every hose in the complete "U.S." line is designed to give maximum service, even under unreasonable demands. Take advantage of the skill and long experience of "U.S." Hose technicians, plus "U.S." research and production facilities. Get U.S. Air Hose at your local authorized "U.S." Hose Distributor, or write us at Rockefeller Center, New York 20, New York. In Canada: Dominion Rubber Co., Ltd.



Mechanical Goods Division

United States Rubber

See things you never saw before. Visit U. S. Rubber's New Exhibit Hall, Rockefeller Center, N. Y.

Operating Ideas (Continued)



1. **UNLAY** two outer strands a distance of 2 ft. Then clean with emery paper.



2. **COAT** each unlayed strand liberally with a heavy joint cement.



3. **CAREFULLY** re-lay strands in their original position and attach connector.

How to Make Good Aluminum-Feeder Connections

ALUMINUM FEEDER CABLE offers several important advantages over copper cable, but it also requires more care during installation. This is particularly true at electrical connections such as splices, terminals and tap joints.

The extra care must be taken because the surface of the aluminum oxidizes very rapidly in the open air. The oxide is transparent, but it is always there under normal exposure. Since the oxide is a very poor conductor of electricity, it must be removed and further oxidation prevented before electrical connections are made.

The following procedure, appearing in the November, 1957 issue of *Haulageways*, is recommended to secure good connections.

Before making a terminal connection or a splice, the two outer layers of cable strands should be completely unlayed

for a distance of at least 2 ft from the end of the cable. Care should be taken to avoid bending the strands out of their normal curvature, which would make them difficult to re-lay. Once the strands are unlayed, there is ample room to work on the ends of the strands without kinking them.

The ends of the unlayed strands are then cleaned by making several passes over each with emery paper to remove the surface oxide. Then each strand is liberally coated with a heavy joint compound, such as No-Ox-Id or Penetrox. The strands are then carefully re-layed in their original position and the connector is attached to the cable in a normal manner.

In some cases, such as when making taps or installing combination feeder-trolley clamps, it is impractical to unlay the strands. A well designed connector,

however, will produce sufficient clamping pressure to break down the oxide between the strands and help to produce a good connection. Even in this case, cleaning and coating the outside of the cable is good practice. Then, when the connection is heated by current flow, the joint compound will flow to the inner strands and provide some protection throughout the cable.

Aluminum connectors or connectors with aluminum liners also should be cleaned and coated with joint compound to inhibit oxidation and make a better electrical connection.

Although the procedure may seem laborious, it actually requires only 10 to 15 min extra work at each splice or terminal. Compared to the many years of life you can expect from your aluminum cable when it is properly installed, the extra time is very well spent.



HIGH-CAPACITY belt winder on crawlers spools up 1,000 ft of belt in 7 to 10 min. Unit holds up to 1,400 ft of belt.

Winder Speeds Belt Moves

MOVING AND RESETTING a belt in 66 min is possible with the aid of this power winder at the Peabody Coal Co., Taylorville, Ill. Average moving time under all conditions is only 1½ hr. The company-designed crawler-mounted unit can wind up

1,000 ft of belt in 7 to 10 min. It can hold up to 1,400 ft of belt.

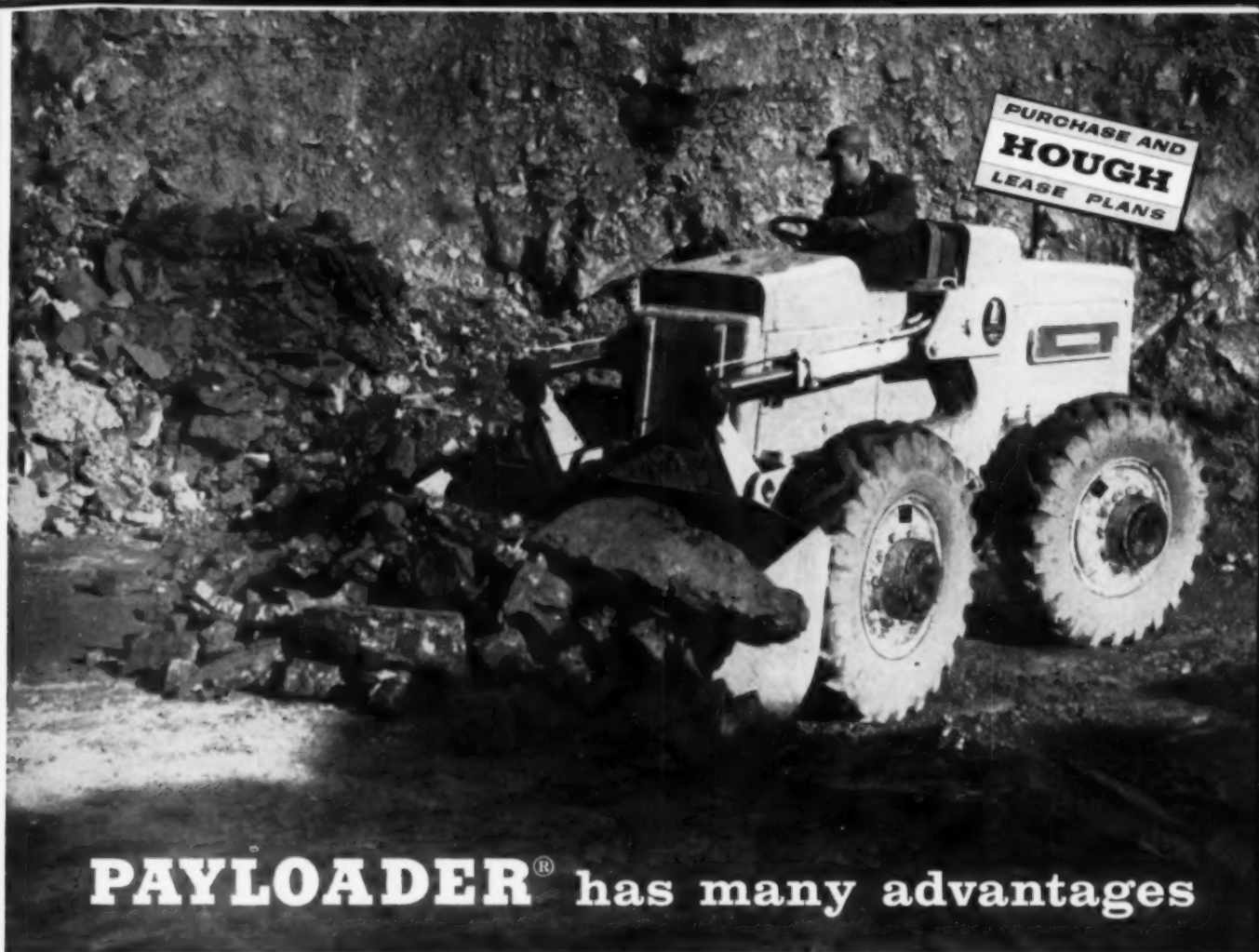
Crawlers are 42-in gage so that the unit can travel on mine track from section to section. The unit has a Joy 11-BU disk pot and disk, and is powered by a 9J motor operating through a 41:1 reducer.

The diameter of the winding reel is 8 ft 6 in. Spokes are made of 2-in pipe with a ¾x4-in rim. The core has a center pickup device so that a spool of belt can be picked up if desired.

Here is how the device is used. It is trammed to a break-through opposite the takeup section of the Ropex extensible belt. The belt is double separated at the drive section, leaving 100 ft of belt in the head. The top side is threaded through a special jack-mounted gate that changes the belt from the horizontal to the vertical position for winding on the reel. A second jack on the opposite side of the belt stops the belt gate in the proper position for winding the belt.

Belt is reeled from the top side of the conveyor until the last 100 ft goes into the tail section. At a signal from a man at the tail section the winder is stopped and the belt broken at a splice near the tail. The remainder is then reeled onto the power winder.

The 1½ hr required for an average move includes reeling up all belt, moving and resetting the drive and tail sections in a new room, and transferring all intermediate belt materials.



PAYLOADER® has many advantages

for Stripping...

"For cleaning the last dirt off the top of the vein, we prefer the big rubber tire tractor-shovel over a crawler type dozer or loader, because it's faster and doesn't chop up the top coal". That's the way so many owners of "PAYLOADER" units express themselves about these 4-wheel-drive tractor-shovels.

for Loading...

In the pit and at the stockpile, "PAYLOADER" units are giving a good account of themselves. Powerful 40" pryout, tip-back bucket action gets full loads quickly on loading operations. The big model HO with 4-yard bucket is a big producer on stockpile work — either loading trucks or carrying to the tippie.

for Clean-up...

Cleaning up around loading shovels in the pit and disposing of cleaning plant waste are popular "PAYLOADER" uses. Big tires, 4-wheel-drive, power-transfer differentials, power-shift transmissions and power-steer make them fast and easy to handle, and sure-footed on poor ground conditions.

OTHER USES: Maintaining haul roads . . . spotting and shifting railroad cars . . . carrying, loading and towing supplies and equipment . . . pulling stalled trucks . . . removing snow.



Modern Materials Handling Equipment

THE FRANK G. HOUGH CO.

LIBERTYVILLE, ILLINOIS
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THE FRANK G. HOUGH CO.

735 Sunnyside Ave., Libertyville, Ill.

Send 4-wheel-drive "PAYLOADER" data.

- ☐ Model HO (9,000 lb. carry cap.)
- ☐ Model HH (7,000 lb. carry cap.)
- ☐ Model HU (5,000 lb. carry cap.)
- ☐ Distributor's Name

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Title.....

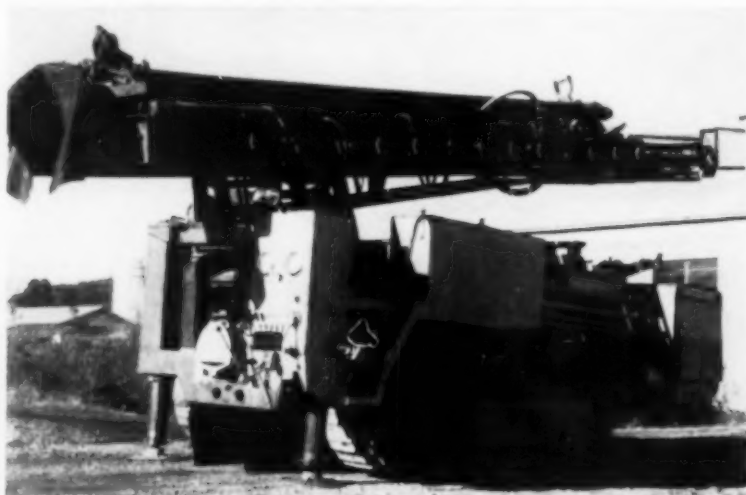
Company.....

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Equipment Developments



Tractor-Mounted Drill Bores Large-Diameter Holes

A new drill, designed by Robbins Coal Co., Oneonta, Ala., features a mechanical drive and utilizes power from the front and rear of a crawler tractor. Model RR10 is mounted on heavy crawler tractors, Caterpillar Model D8, or International Harvester Co., Model TD-24. The Robbins Co. says that the drill enables strip-mine operators and contractors to use low-cost explosives and drill large-diameter holes. By drilling large holes on wider spacings and getting fast penetration rates, cost of drilling and blasting is greatly reduced, continues the firm. The drill has a control panel upon which

all levers are located. It is possible to vary down pressures on the bit up to 60,000 lb by use of two 6¼-in. I.D. feel cylinders. A 600 CFM rotary compressor is mounted on the front of the tractor to provide air for removal of cuttings from 6 to 10 in. blast holes. Proper gear ratios in the transmission, the right angle drive, and floating head make it possible to vary drill rotation speeds from 20 to 180 rpm. The Robbins drill is engineered and designed, says the firm, to drill blast holes varying diameter from 6 to 10½ in. It is possible to drill various size holes by changing a pipe adaptor.



Tractor-Shovel Is Biggest

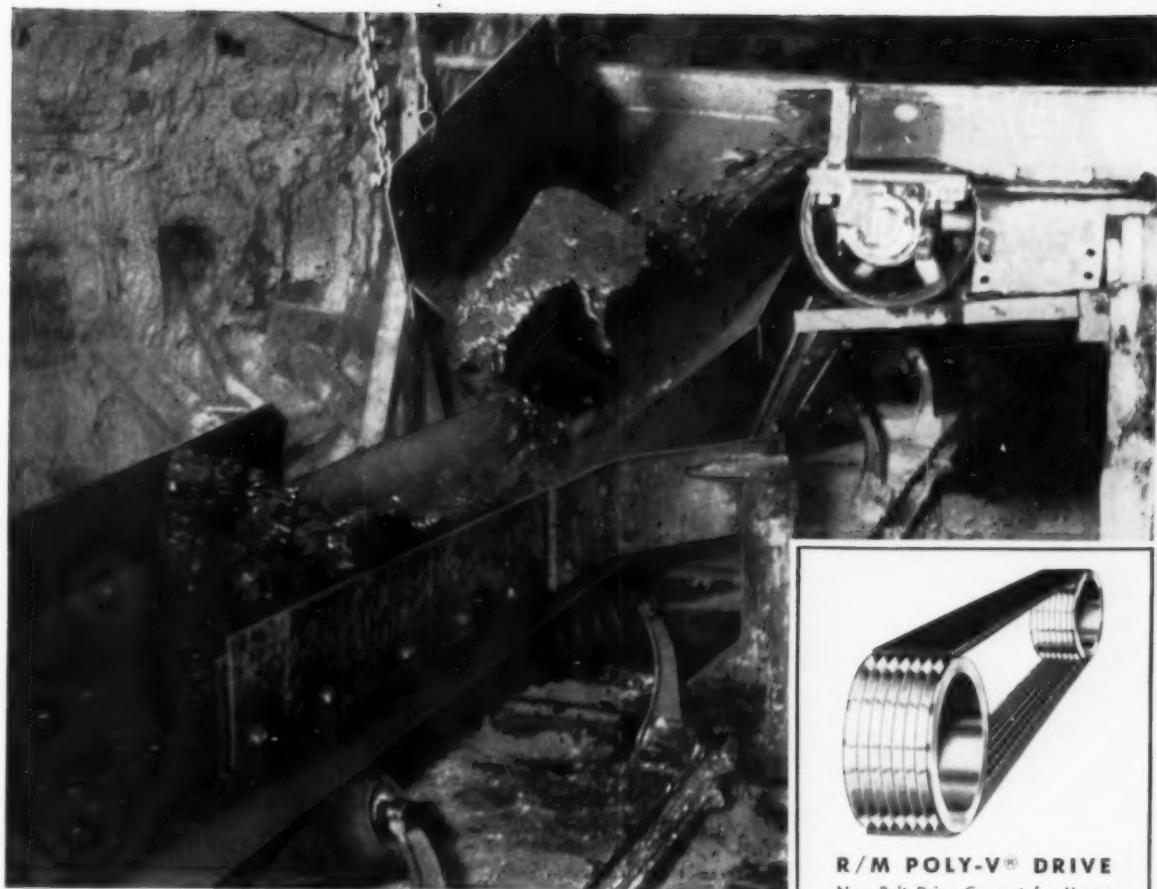
The largest and most powerful Trojan shovel ever built is in production at Yale & Towne Mfg. Co.'s Machinery Div., Chicago, Ill., according to the firm. Model 404 weighs 40,000 lb and has a capacity of 14,000 lb. It handles all types of bulk material. It has proved itself in coal stripping and quarry operations, states the firm. Besides four-wheel drive and pneumatic tire loaders, the huge tractor has other specific highlights. You can shift into any of the forward and reverse speeds at full throttle without stopping at any point, say the

engineers. Besides this, the machine cuts into a work pile with full power every time because of the straight line horizontal thrust of the operating arms. This thrust starts the push of the arms from the rear of the machine, continuing it through the body to the cutting edge of the bucket. The operator can crowd the work pile while maintaining full traction on all four wheels and normal steerage.



New Single-Motor Shuttle Car

A Torkar, single-motor shuttle car that is only 30 in high has been built by engineers of National Mine Service Co., Pittsburgh, Pa. Torkar 30 features items found in Model 48. A single AC or DC motor feeds power to the low shuttle car. This makes for easy wiring and simple controls. A torque converter transmits motor output to the constant-mesh trans-



WHY BUY ONLY $\frac{2}{3}$ OF A CONVEYOR BELT?
R/M CONVEYOR BELT GIVES
for Your
"More Use per Dollar"

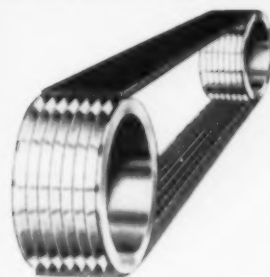
It's the *last* one-third of conveyor belt life that determines its final cost. R/M engineers recognize that every belt feature — troughability, resiliency, fastener holding ability, strength member fabric, cover toughness and thickness — all help determine the *true* cost of Ray-Man Conveyor Belt on your job. That's why every Ray-Man component is precision proportioned to assure better belt balance where it pays off most for you — in longer belt service life!

Let an R/M representative show you how these features add up to "More Use per Dollar" on your job . . . with Ray-Man and other R/M heavy duty belts.

RAY-MAN CONVEYOR BELT

- Trains Naturally • Resists Impact and Ripping
- Double Compensation Relieves Outer-Ply Stress
- Holds Fasteners • Requires No Breaker Ply
- Exclusive "XDC" Long-Wear Cover
- Moisture Resistant, Mildew-Proof

Available in Special FIRE RESISTANT Construction with Bureau of Mines' Acceptance Designation: "Fire Resistant, U.S.B.M. No. 28-10."



R/M POLY-V® DRIVE

New Belt Drive Concept for Heavy Duty Power Transmission. Eliminates V-belt matching problems. Delivers up to 50% more power in the same space as regular V-belts . . . or equal power in less space!

Write for copy of Poly-V® Drive Bulletin #6638.

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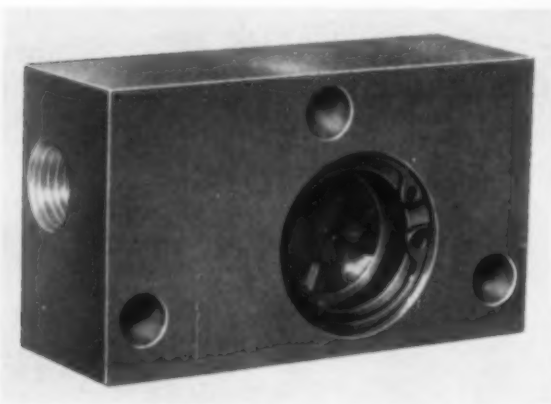
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Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

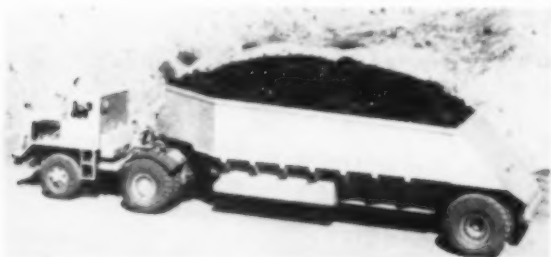


mission. This converter smooths the flow of power and shields the motor against damage from overloading. There are three speeds forward and three reverse on the car. The operator selects the gear best suited for roadbed conditions. New heavy-duty wheel units have high torque capacity and interchange completely, says the company. The low shuttle car has four-wheel drive and an overall length of about 22½ ft. It is designed for thin-seam mining.



Visual Indicator Saves Filters

A simple visual indicator which will save filters and repairs by keeping tab on the condition of filter elements in oil hydraulic systems is ready for sale. Schroeder Bros. Corp., McKees Rocks, Pa., says "Spindicator" shows at a glance when an oil filter is dirty and non-functioning. A spinner is mounted behind a window in the Spindicator wall. It will only revolve when the filter is clogged and needs cleaning or changing. This warns the operator and prevents damage to circuit components. Easily installed, the Spindicator is connected in parallel with any size Schroeder line filter or other make. The unit operates in any position and need not be located at the filter.



Coalhauler Carries More

A coalhauler rated at 335 hp and designed in trailer form will pull a 56-ton load. Built by International Harvester Co.'s (Chicago, Ill.) Construction Equipment Div., the Model 95 bottom-dump coalhauler has completed a year of testing and is ready for marketing. According to its testers, the machine has five highlights: good operating comfort; steers easy with a practical turning radius; good braking on tractor and trailer; good cab vision; and fast trailer-dumping mechanism. The tractor is like the "Payhauler," an off-highway truck sold by International. Model 95 has a Cummins NRTO-6BI diesel engine which delivers 335 hp at 2,100 rpm. This is ample power to handle a 56-ton payload. The coalhauler can be equipped with either a nine-speed manual transmission or a four-speed automatic transmission. It is made of ¾ in. high-strength steel side plates reinforced with channel sections.



Rippers Are Versatile

Rippers which penetrate to seven feet and are efficient in tearing up frozen ground are produced by Crutcher-Rolfs-Cummings, Inc., Houston, Tex. One ripper (shown here) with a raisable 104-in shank has worked in three separate industries—pipelining, strip mining and road building. It is mounted on a Caterpillar D-9 tractor and is used with one, two or three shanks. Coal ripping with this machine, states the company, will aid in getting coal of better size and content, and will save blasting costs.



Extra Payload Dump Trailers

Dump trailers which carry greater payloads have been introduced by Loadmaster Co., Shreveport, La., a newly formed firm. The trailers have design ideas which permit reductions in empty weight of 1,000 to 3,000 lb per trailer with correspondingly greater payload capacities. A new hydraulic-cam-action lift system permits extremely high dumping angles for handling sticky clays and other hard-to-dump materials, reports the firm. You can dump at angles as high as 80 deg on some models and 60 deg on the longest dump beds. Production models are offered in various capacities from 10 to 30 cu yd.

Enlarged Truck Line

Large, sturdy, gasoline-powered trucks are featured as Ford Motor Co., Dearborn, Mich., thrusts into a new field in truck building. J. O. Wright, vice president of the firm, states that, "For the first time, Ford dealers will have a complete line of trucks to meet virtually all requirements of truck operators." The new line includes heavy-duty tilt cabs, conventional and tandem models ranging from 25,000 to 51,000 lb gw and 50,000 to 75,000 lb gw. The new engines are said to have the highest horsepower of volume-produced gasoline truck engines. Many of the trucks feature power steering and full air brakes powered by an integral air compressor. All of them use double-channel frame construction.

(Continued on p 156)

B.F. Goodrich



Tires haul 25 tons of coal or rock, give strip miner 2 retreads!



SHENANDOAH STRIPPING operation of Reading Anthracite Co. Firm reports more mileage, more retreads with B.F. Goodrich tires.

SIXTY-THREE giant trucks haul 20- to 25-ton loads of coal for the Reading Anthracite Company of Shenandoah, Pa. Weather ranges from 10° below zero to 100° above. Roads are rocky, winding and mountainous.

Because of this tire-killing work, the Reading people were plagued by blowouts from rock impacts. Mileage was disappointing, and often tires could not be retreaded. Then the company began using B.F. Goodrich FLEX-RITE NYLON Rock Service tires. Result: substantially more service than from other tires—as many as 2 retreads per tire with up to 80% of original service on each retread.

This experience is typical. Miners report more retreadable tires and longer, trouble-free service from B.F. Goodrich Rock Service tires. Husky cleats grip the ground for positive traction in forward or reverse. And the B.F. Goodrich

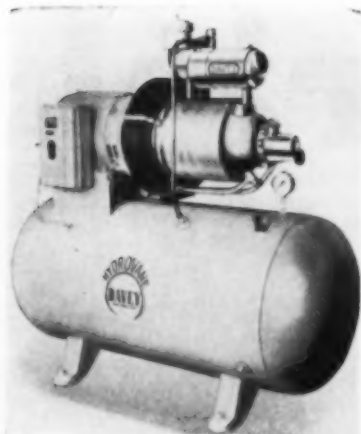
FLEX-RITE NYLON cord body is stronger than ordinary cord materials, withstands double the impact and resists heat blowouts and flex breaks. That's why it outwears even the extra-thick tread, can be retreaded again and again.

Your nearby B.F. Goodrich dealer will show you his complete line of money-saving tires for mine work. See him today or write B.F. Goodrich Tire Co., A Division of The B.F. Goodrich Co., Akron 18, Ohio.

Specify B.F. Goodrich Tubeless or tube-type tires when ordering new equipment

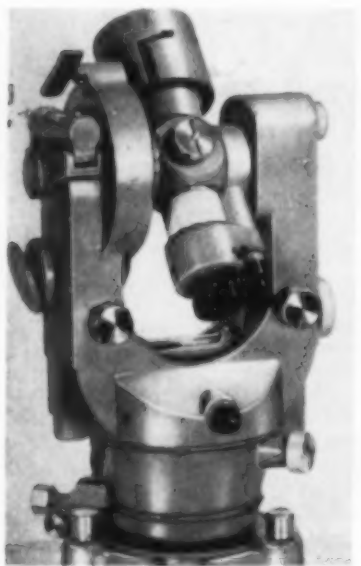


Your B.F. Goodrich dealer is listed under Tires in the Yellow Pages of your phone book



Quiet Rotary Compressors

Tank-mounted rotary compressors made by Davey Compressor Co., Kent, Ohio, vibrate nary a bit and are very quiet, according to the firm. Known as Davey Hydrovane rotary units, these operate at 100 and 200 psi. They can be installed easily and do not require special compressor rooms or foundations, say Davey engineers. Units are entirely enclosed. There are no belts or couplings. Users choose either vertical or horizontal tank mountings. Lightness and compactness, which save up to 60% of the space required by other compressors, are other reputed advantages.



Repeating Transit

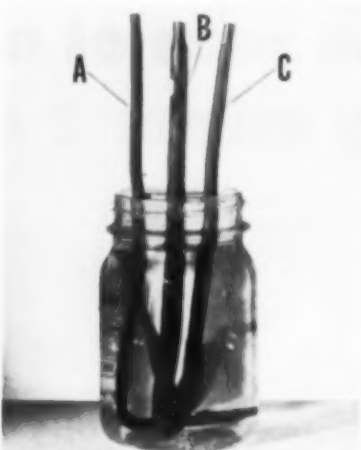
The new Wild T-1 Optical repeating transit is ideally suited to all land and heavy construction surveying, as well as mining operations, according to the manufacturer. Wild Heerbrug Instruments, Inc., Port Washington, N. Y., makes this transit. It is speedy, accurate

and easy to use, says its designer. A Swiss precision unit, it provides at-a-glance readings in the microscope mounted next to the telescope. Set-up time is reduced, especially on windy days, by use of an optical plummet. Built into the alidade, the plummet can readily be checked by rotation.



Tough Cutting Edges

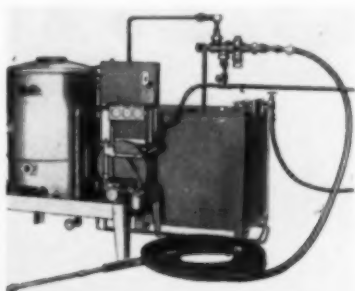
Specially developed cutting edges from Caterpillar Tractor Co., Peoria, Ill., have the three prime requisites of an ideal cutting edge, according to the firm: extreme hardness to resist wear; unusual strength to sustain shock without bending or breaking; and thin enough to penetrate materials easily. "Hi Electro" cutting edges are processed so as to provide "super-hardness" and were given all sorts of severe tests, states the company, but no signs of damage were seen afterwards. These new edges are now available.



Cable Jackets Improved By New Compound

Jacket moisture-absorption rate is reduced more than 50% by adopting a new and improved Neoprene compound for jackets on Versatol Geoprene and Super Coronol Geoprene single-conductor power cables, says General Electric Co., Bridgeport, Conn. This reduction of moisture absorption brings about im-

provements in other physical properties of the neoprene jacket, such as tensile strength, aging and resistance to oil.



Rugged Jet Cleaner

A jet cleaner with steam for high impact, heavy-duty close up cleaning or hot hydraulic jet stream for distant surfaces, is the product of two companies, Clayton Mfg. Co., El Monte, Cal., and Seller Injector Corp., Philadelphia, Pa., combined to build the Clayton-Sellers steam and hydraulic jet cleaner, Model CS 628. Used as a steam cleaner it gives 280 gal per hr at 90 at 100 psi. As a hydraulic cleaner the machine delivers 500 to 600 gph at 220 psi to 210 F. This pressure, states the firm, allows the operator to clean hard-to-reach cranes, frames, towers, etc.



Foot Protection

Three independent steel plates overlap at the front of this safety shoe to extend steel toe protection to the entire forepart of the foot. Lehigh Safety Shoe Co., Emmaus, Pa., designed it and added a "floating bridge" over the ball joint. This flexes with the foot, permitting normal walking comfort. Heavy-duty, oil-resistant Neoprene cork outsole and heel give excellent skid-resistance.

Tractor-and-Trailer Unit

A new planetary-axle tractor, and a matched bottom-dump trailer with rated capacity of 50 tons, have been devel-



How can you beat a frog like this one?

This is a No. 4, 85-lb AS, cast manganese frog, Bethlehem Design 289, recently installed in a West Virginia track layout. Tilt the magazine horizontally and sight along the rails. Did you ever see more perfect alignment? Is it any wonder that high speeds can be safely maintained through this turnout?

Notice, too, the use of Bethlehem Hook Frog Plates to anchor this frog to the ties. Notice especially the large and sturdy hooks which engage the base of the frog. Those hooks, being integral parts of the plates, hold the frog far more securely than regular track spikes ever could because they distribute track motion over a broad area of the ties. Thus the spikes which anchor the plate are freed from direct pull, and both vertical and lateral thrust are held in check.

As you well know, turnouts and crossings are

more apt to cause operating troubles than any other part of your track system. You can avoid these troubles with Bethlehem's help. All Bethlehem trackwork and track components are precisely and painstakingly made, and nearly all of it is pre-assembled in our shops as added assurance of perfect performance in your mine.

A Bethlehem engineer would like to look into your haulage problems with you to see how efficiency might be stepped up. There are no strings attached to an initial survey, and such a session might prove highly valuable to you. Just call or write our nearest district office, or write direct to the address below.

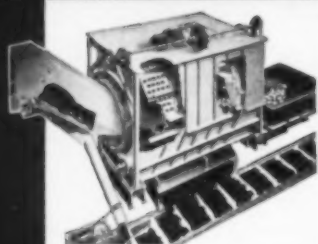
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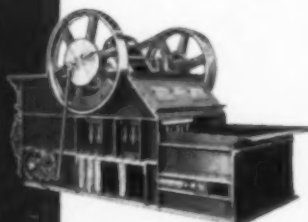
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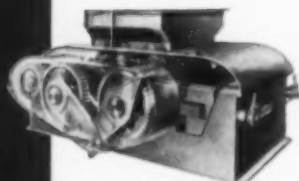
**McNally Pittsburgh
Rotary Breaker**

This unit allows positive control of top size in handling run-of-mine washery feed. Production of fines is held to a minimum.



**McNally Norton Vertical
Pick Breaker**

50% Less fines when reducing lump to egg and stove sizes.



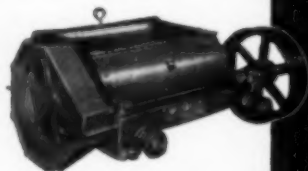
**McNally Double Roll
Gearmatic ROM Breaker**

Built in tonnage ranges from 750 tph to 1400 tph. Full floating gearmatic drive.



**McNally Gearmatic Stoker
Coal Crusher**

This unit offers three prime advantages: high volume production, plus accurate sizing, plus low percentage of fines.



McNally Single Roll Crusher
Universal application 20", 24" and 26" diameter rolls.

AVAILABLE

From Stock and on Short Delivery

For immediate action on complete information write, wire, or call.

McNALLY PITTSBURG MFG. CORP.

Pittsburg, Kansas

Wellston, Ohio

Equipment News (Continued)

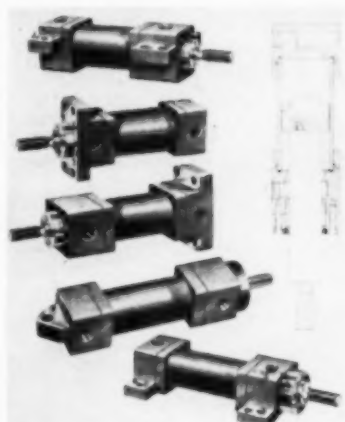
oped by Autocar Div. of White Motor Co., Exton, Pa. The tractor, AP-25T, is the fourth model in an off-highway planetary line put out within a year at the company and is for use in coal hauling operations. It puts the firm in a position to meet the demand for huge bottom-dump coal haulers in which semi-trailer design is necessary. The AP-25T is joined to the trailer by a special new universal hitch assembly. It is powered by a 335- or 375-hp turbo-diesel engine.



New Coagulant

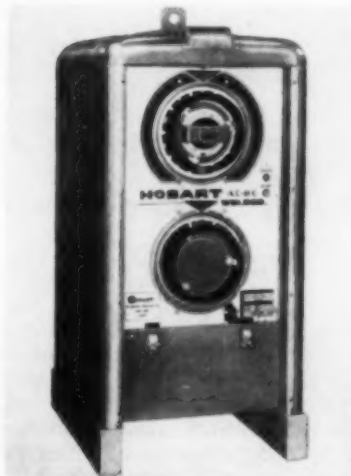
A new organic flocculating agent, Plyox, has shown exceptional ability to increase settling and filtration of dispersed solids, according to Union Carbide Chemicals Co., New York, N. Y. It is a high-molecular-weight grade of Carbide's new family of Plyox water-soluble resins. Carbide chemists suggest using it as a dilute solution, the strength

depending on the nature of the slurry to be processed.



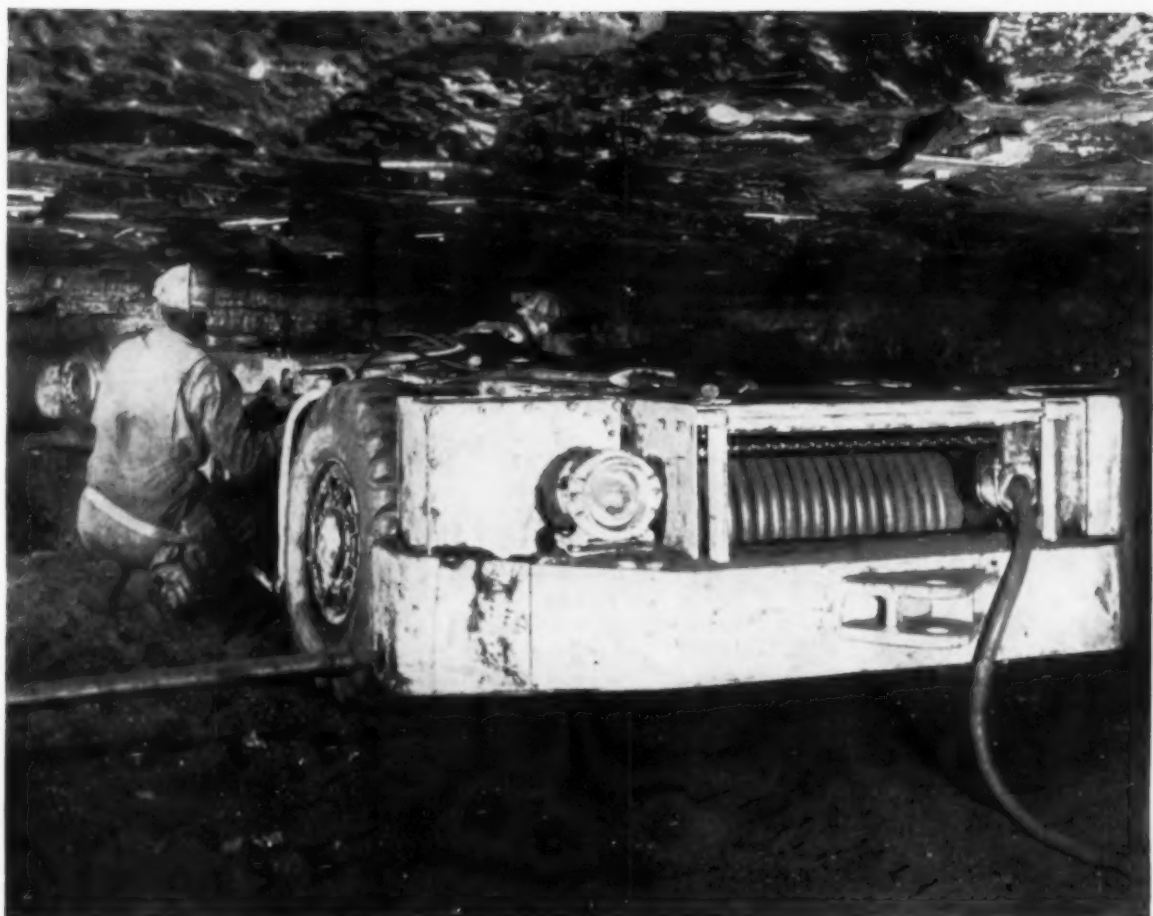
Double-Acting Cylinders

A new line of 2,000 psi double-acting hydraulic cylinders with interchangeable foot lug, center lug, front flange, rear flange, and clevis-mounting steel-end heads are available from Oilgear Co., Milwaukee, Wis. These cylinders are built in eight sizes (2" to 8" inclusive), with standard or large rams, with strokes up to 160" and with dashpot cushions for either or both end heads.



AC-DC Arc Welder

A combination AC transformer, DC rectifier arc welder with provisions for inert-gas welding is out from Hobart Brothers Co., Troy, Ohio. You weld with either DC or AC by shifting a selector switch. It also has a magnetic line switch and removable rheostat for remote control at no extra cost. A current overload device protects both transformer and rectifier while a thermostat adds extra safety for the rectifier. Model AD-264-S is rated 200 amps at 40 V



ON TRAILING CABLE...

Only NEOPRENE gives extra protection against overheating

Heat build-up in trailing cable on a machine reel can be severe. Natural ventilation can't remove the heat, and if an accidental overload should occur the conductor may get hot enough to damage the insulation and jacket.

But neoprene jackets, because they are vulcanized, will not soften at temperatures as high as 500° F. Tests of non-vulcanizable jacketing materials show that they will melt at 400° F., and even at 300° F. these materials become soft and deform under load to leave weak spots.

This extra protection offered by neoprene is just one reason for its

complete acceptance for trailing cable jackets. Neoprene is flame-resistant. It also resists oil and grease, acid mine water, abrasion and cutting. On the surface, it is unaffected by weathering and sunlight. It won't become stiff and hard to manage at low temperatures.

For fifteen years, neoprene's combination of properties has paid off in safety and economy for coal mine operators. The next time you order trailing cable, make sure it is jacketed with neoprene.

For more information on neoprene in cable, conveyor belting and other

applications, write for ELASTOMERS NOTEBOOK to E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Department CO-3, Wilmington 98, Delaware.



Better Things for Better Living
... through Chemistry

NEOPRENE

made by Du Pont
for 25 years

H & P wet cyclones



H & P
14" Cyclone

New H & P 14" x 14" Cyclone with replaceable rubber liner

has a very broad field of application. In the coal industry, it is by far the most widely used cyclone thickener. This cyclone is designed for classification in the 200-65 mesh range. It has a nominal rating of 500 GPM at 35 PSIG feed pressure.

The New H & P 14" Cyclone is used:

TO RECOVER marketable coal,
conserve water and increase pond life.

TO PREPARE feed to froth flotation units.

TO CLOSE water circuits in combination
with H & P 3" cyclones and vacuum
filters—the low-cost water clarifi-
cation circuit.

H & P Cyclones serve the
coal industry by the thousands. . . .
permitting

- Closed circuit operation
- Recovery of fine coal
- Prevention of stream pollution
- Control of washing water density
- Conservation of water
- Sharp classification for washing operation

For the most economical classifying and thickening
investigate the H & P Cyclones.

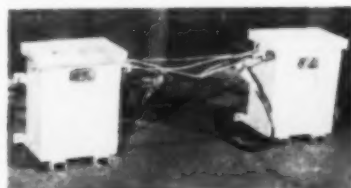
Get all the facts. . . Write for booklet 1157 today!

Heyl & Patterson INC.

55 FORT PITT BLVD., PITTSBURGH 22, PA., COUrT 1-0750

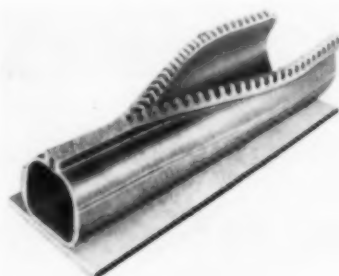
Equipment News (Continued)

with a welding range of 12 to 330 amps, AC and 12 to 360 amps, DC. Model AD-364-S is rated 300 amps at 40 V and has a welding range of 12 to 420 amps, AC and 12 to 400 amps, DC.



Transformers Have Silicon

All Uptegraff dry-type transformers, 112½ kva and smaller, are silicone-impregnated now, regardless of insulation classification, says R. E. Uptegraff Mfg. Co., Scottsdale, Pa. They report that silicone additions give up to 40% greater overload capacity, while providing superior moisture resistance and freedom from embrittlement and cracking. In the picture, is a class B transformer (left) with standard insulating varnish which is failing at 210% of rated load. A transformer on the right of similar capacity and design, but with silicone-impregnated insulation, withstood 300% of rated load, according to Uptegraff.



New Zipper Conveyor

New features have been added to the Zipper conveyor, a product of Stephens-Adamson Mfg. Co., Aurora, Ill. The firm's bulk-handling specialists say that the "closed-belt-type" conveyor can transport bulk materials in any plane to considerable heights and around obstructions. Materials may be conveyed within the belt, sealed and dust-tight. According to the firm, material won't slide, isn't scooped, pushed or thrown, but is gently carried without breakage or agitation. In previous design the tube had been formed between two sidewalls plus a portion of the basebelt, joined together by hinges. Instead of three pieces, the new design features a tube formed on one piece of flat rubber with teeth along the edges. These teeth interlock as the belt closes to form the rounding rectangular conduit. Fabric is em-

3 sure ways to cut mining costs

with **USS** "T-1" Steel



Shovel and dragline buckets last longer. This huge shovel dipper rams through rock and shale . . . scoops up 80 tons at a bite . . . works continuously day after day. Breakdowns are costly. To prevent failures they built the bucket with USS "T-1" Steel. It's designed to take this kind of battering, shock and impact abrasion. And its amazing toughness never falters—even at temperatures far below zero.



Shuttle car bottom plates give months of extra life. USS "T-1" Steel is often specified for the bottom plates of the National Mine TorKar shuttle cars because of its resistance to impact abrasion. The coal mining or loading machine empties into this car, which progressively conveys its load to the rear until the car is full. Then it trams to the main haulage point and discharges its load.



Truck liner cost cut 75%. Truck liners in mining service take a terrific scouring from the combination of impact and abrasion. They wear out fast. But the owner of these trucks heard about USS "T-1" Steel and put 1" plates on the bottoms and 1/2" plates on the sides. Now he's getting twice the life at half the cost of previous liners. This figures out to be a saving of 75%.

Here's why USS "T-1" Steel can help improve your equipment:

- Nearly three times the yield strength of structural carbon steel.
- Outstanding resistance to the combination of impact abuse and abrasion.
- Exceptional toughness, even at sub-zero temperatures.
- Readily weldable without preheating.

No other constructional alloy steel available today combines such great strength with toughness, resistance to impact abrasion and ready weldability. It is a proven steel. Use it for dippers, sticks, booms, chutes, hoppers, cars, trucks—and your maintenance costs will tumble to rock bottom. Write for our booklet, "Mining's Metal," United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and "T-1" are registered trademarks.

USS United States Steel



EXIDE-IRONCLAD BATTERIES

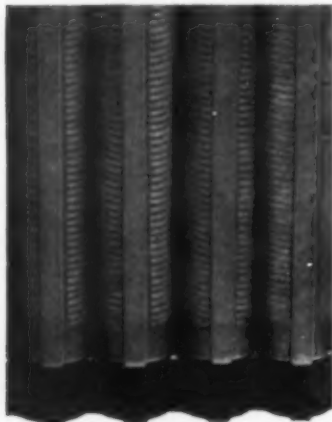
—best buy for the long haul

More ton-miles per dollar—that's the reason most cost-conscious mine operators prefer Exide-Ironclad Batteries for mine locomotives.

Experience has proved over the years that no other battery make matches Exide-Ironclad for average life in service and tonnage hauled. Rating for rating and dollar for dollar, Exide-Ironclad gives you more real value . . . more return on your investment.

Today's Exide-Ironclad features improved tubular construction, making it even better than the models that chalked up the industry's records. So you can expect even longer life potential and superior performance.

Total work output, not mere price, is the key to battery economy. When you buy batteries, specify Exide-Ironclad and get the most production capacity your dollar can buy. For details, write Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.



High-capacity, long-life tubular construction. Gives positive plate one-third more surface area for greater power reserve. Power tubes hold active material securely for long battery life.

Exide®

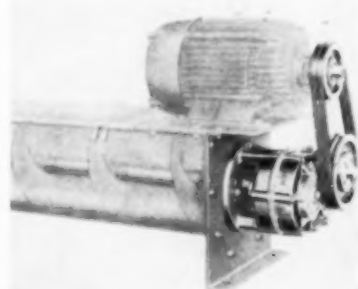
Equipment News (Continued)

bedded into the rubber of the tube to strengthen it against tearing and cracking. The new design permits easy cleaning of the belt, says the firm, as it passes in a flat position around flat face pulleys.



Fan Has Extended Shaft

In operations where the motor must stay out of the air stream, the "ES" fan, an extended-shaft orifice ring fan designed by Chicago Blower Corp., Franklin Park, Ill., is just the thing, says the firm. This direct drive fan is basically designed for exhausting gases or corrosive fumes but may be used also to circulate high-temperature air for drying.



Screw Conveyor

Simple to mount and adjust on standard conveyor troughs is the description given to a new screw conveyor drive by Dodge Mfg. Co., Mishawaka, Ind. The unit has a new concept in application and several new ideas in design. It consists of a speed reducer with packing gland and driving shaft, which mounts on the trough end. Dodge engineers state that the screw conveyor gets top efficiency with its heat-treated helical steel gears and pinions. Timken bearings are used in the screw conveyor drive to provide good thrust and radial capacity. There is no sliding motor base for the drive. Instead, slotted holes in the flange of the reducer permit the unit to be rotated for quick and easy adjustment of the V-belt drive center distance.

Sling Chain

A sling chain which is quickly assembled and put into immediate service is now available from Cambell Chain Co., York, Pa. The Cambell program is



"Because of outstanding performance,"
says J. B. Rich, Pres.—

**"Gilberton Coal's
electric-powered
excavators use
General Electric
systems—exclusively"**

**"One shovel has operated 6000 hours
with only routine maintenance"**

Gilberton Coal Company is a fast growing firm mining a rich anthracite coal vein in eastern Pennsylvania. Because Gilberton has received dependable, continuous operations from General Electric equipped shovels and draglines, all their electric-powered excavators now utilize G-E motors and control.

General Electric Engineers work closely with shovel and dragline manufacturers to carefully match all characteristics of electrical amp-dyne control, motors, and generators with those of the shovel or dragline. This co-ordinated electrical-mechanical design results in rugged, rapidly

responding machines like those setting performance records at Gilberton Coal Co.

What's more, in quarry and mining areas throughout the nation, you will find G-E renewal parts distributors and complete, efficient, around-the-clock service from near-by General Electric Service Shops.

When You Plan to purchase an electrical excavator for your mining operations, specify a machine powered and controlled by General Electric system-engineered equipment. Write Section 663-49, General Electric Co., Schenectady, N. Y.



32-YD WALKING DRAGLINE takes a 50-ton bite of overburden, dumps it, and swings back for another—*every 50 seconds*. Tremendous power (4950 hp) and precisely responding controls regulate this performance. Heart of the G-E electrical system in this Bucyrus-Erie dragline is the 1500-hp synchronous motor and 600-hp induction motor driving generators which feed d-c power to drag, hoist, swing and walking motors. The dragline operates 130 hours per week, year 'round.

Engineered Electrical Systems for the Mining Industry

GENERAL  ELECTRIC

Equipment News (Continued)

called, "Customized," because it provides sling-chain users with just what they need, avoiding long waiting periods for chain.

Equipment Shorts

BALL BEARINGS—Special ball bearings for conditions of extreme dirt and moisture are products of Marlin-Rock-

well Corp., Jamestown, N. Y. Series M-R-C power-transmission ball bearings are prelubricated and equipped with "Labri-Seals." These seals have a metal flinger which repels dirt and moisture and protects the thin lip of the synthetic rubber which runs on the outside of the inner ring.

PROTECTIVE COATING—Surfaces of bearings, machine cams, kicker fingers and other metal parts subject to wear can give 150% more wear resistance with a coating of a special substance from Walmet Corp., Madison Heights, Mich.,

according to the firm. The new coating, which Walmet calls "Spra-Carb," is sprayed on the base metal in thicknesses up to 1/6 in and fuses at temperatures of 1300 to 1400 F.

INDEPENDENT BRAKE—An independent brake-control group has been made available for the Caterpillar DW20 tractor, announces Caterpillar Tractor Co., Peoria, Ill. Designed for use with either wagons or scrapers, the attachment makes it possible to engage the brakes of the trailed unit only. It works apart from standard tractor brakes, and serves as an anti-jacking device when operating on hazardous ground.

CORROSION PROTECTION—It is now possible to line large areas with minimum installation problems, in protecting them from corrosive elements, says Wagner Bros., Inc., Detroit, Mich. A product of this firm called "Vyflex Fligid" is said to protect base materials of both ferrous and non-ferrous metals, concrete as well as wood. It resists a broad line of corrosive elements as well as many corrosive organic chemicals.

NEW SHOVEL—A new 2½-cu yd tractor-shovel known as Model 200 has been announced by the N. P. Nelson Iron Works, Clifton, N.J. It features underslung arms with 100% operator visibility and safety. The firm says that cylinders, hoses, etc., never protrude past the operator's cockpit. Model 200 is powered by a Continental M-363, 117-hp gas engine or G, 3-71 diesel. It weighs 19,500 lb.

CONTROL VALVES—A line of 600 to 4,000 psi cylinder-operated hydraulic control valves, with operating pressures ranging from 60 to 140 psi is available from Sinclair-Collins Valve Co., Akron, Ohio. Use of an integral double-acting cylinder for valve operation is said to reduce valve-mounting space requirements to a minimum and afford split-second response due to positive pressure actuation in both directions.

AIR COMPRESSORS—A series of continuous-duty air compressors delivering from 47 to 105 cu ft of air per min at pressures of 100 lb per sq in, has been developed at Atlas Copco Eastern, Inc., Paterson, N. J. The new units of this NT series are designed to serve air requirements of small concerns or to serve as off-shift air sources for large industrial plants. They range in weight from 440 to 595 lb, and may be installed either as stationary or portable units.

ALUMINUM SHELTERS—Aluminum buildings which come completely fabricated and need only to be bolted together are available from J. B. Schrell



for tough coal screening operations

CF&I SPACE SCREENS

Manganese—CF&I Manganese Space Screens, made of ¼" or heavier wire, are extremely shock-resistant. This type of screen takes crushing, tumbling, pounding in stride, lasts longer on scalping operations or similar tough screening jobs. Eliminate needless, costly downtime . . . get CF&I Manganese Space Screens.

Other CF&I Space Screens for Coal Screening Operations include:

Wissacloy®—a rugged, economical, general-purpose screening tightly woven of

carefully crimped special alloy steel wire. **Stainless Steel**—a durable, unexcelled quality screening for washing and other operations where wet, corrosive materials must be processed.

Whatever your coal screening requirements, there's a CF&I Space Screen designed for the job. Furnished in a wide range of standard dimensions, CF&I Space Screens can be supplied with the edge preparation you specify. Contact the CF&I sales engineer in our office nearest you.

CF&I SPACE SCREENS THE COLORADO FUEL AND IRON CORPORATION

In the East: WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

In the West: THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Antonio • San Francisco • San Leandro • Seattle • Spokane • Wichita

CF&I OFFICES IN CANADA: Montreal • Toronto

CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

5923

Simple, balanced design allows this 6-yd. Manitowoc Model 4500 drag to get over-flowing buckets right at the edge of the cut.



Bigger Bites

MANITOWOC DESIGN PUTS ALL THE POWER TO WORK

There's no wasted horsepower with a Manitowoc Model 4500. Intelligent design forethought has reduced power-robbing extra parts throughout this big capacity mining machine. In fact, there are only 15 gears and 8 sprockets! And *only working gears turn* . . . Manitowoc's exclusive slide pinion arrangement disconnects all others until their function is needed. Even many *small* excavators don't have simplicity of design like this!

Powered by a single diesel power package rather than a series of independent electric motors, the 4500 has the get up to go anyplace . . . unhampered by trailing electric power cables. There's no downtime due to the failure of delicate electric switches, control boards or miles of wires. Put more power to work in *your* mine with a fast digging, long reaching Manitowoc 4500 shovel or dragline. A call to your Manitowoc distributor will bring all the facts.

MANITOWOC ENGINEERING CORP. Manitowoc, Wis.

GREATER SPEED AND POWER—LESS DEAD WEIGHT

TRUE MOBILITY TO MAKE MINING PROFITABLE ANYWHERE

GREATER STABILITY PRODUCES FULL BUCKETS, LOWER GROUND PRESSURE

DRAG TRAVELS ANYPLACE WITH A LOW, LOW TRAVEL CLEARANCE OF ONLY 17' 2"

BONUS CAPACITY IN ANY MATERIAL—MANEUVERABILITY OF A SMALL MACHINE

SHOVELS 1 - 5½ YD.

Manitowoc

CRANES 20 - 100 TON

Here's How... to make a PROFIT from COAL FINES



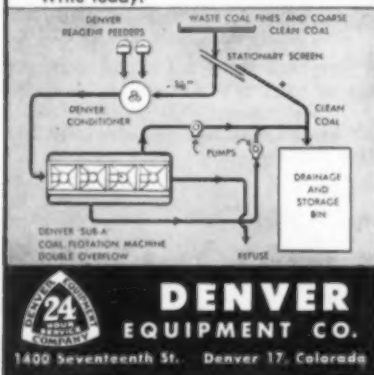
with DENVER "Sub-A" COAL FLOTATION

Simple...Low Cost!

You can handle coarse coal ($\frac{1}{8}$ "x0") at the head of your circuit in DENVER "Sub-A" Flotation Machine. You save coarse as well as fines in a coal product which is easily dewatered! You have simple, low-cost system.

Over 90% of all coal flotation plants in U. S. are Denver "Sub-A", an outstanding testimonial to DECO's experience, engineering "know-how" and equipment.

DECO can provide complete testing, engineering service, flow-sheet design and all equipment for your coal flotation plant. One source of supply, one responsibility. Write today!



DENVER
EQUIPMENT CO.
1400 Seventeenth St. Denver 17, Colorado

Equipment News (Continued)

Corp., Los Angeles, Cal. A 10 ft by 20 ft Carport or shed can be built in 30 min by two unskilled homeowners, says the firm. With a roof of corrugated aluminum it weighs less than 100 lb without sides or 150 lb with sides. Shipping is fairly inexpensive.

Free Bulletins

SOLID-FILM LUBRICANT — Electro-film, Inc., North Hollywood, Cal., offers a bulletin on all-purpose solid-film lubricant, No. 4396. It is said to be one of the first of its kind to be considered a high load-carrying solid-film lubricant. It has about 90% molybdenum disulphide and 10% graphite by weight. The new booklet gives data on wear-life versus load at various speeds along with friction properties of the dry lubricant.

HEAVY-DUTY BRAKES — B. F. Goodrich Co., Akron, Ohio, has out a brochure telling about the use of Hi-Torque brakes for heavy duty and off-highway vehicles. The brochure explains how the brakes increase the service life of heavy equipment, how they permit quick stopping and how they give equipment operators greater safety and control. Complete specifications are also listed.

SHAFT-MOUNTED DRIVES — Falk Corp., Milwaukee, Wis., has prepared a leaflet, No. 7100, on the complete line of Falk shaft-mounted drives. It presents all the details necessary for the reader to select the mounted drive best suited to the size, horsepower and ratio requirements for his need. It also gives some useful ideas on how the shaft-mounted drive is being used in industry today.

MATERIALS HANDLING — Syntron Co., Homer City, Pa., announces a new catalog on its bulk-materials-handling equipment and other products. The Syntron products listed include vibrators, packers and jolters, car rappers, hopper level switches, flow control valves, feeders, screens, etc. The catalog has 60 pages of illustrations, descriptions and specifications.

MOTOR DIMENSIONS—Reliance Electric & Engineering Co., Cleveland, Ohio, makes available a new bulletin, No. B-1284-1, giving NEMA frame assignments and overall dimensions of Reliance AC motors in new NEMA frame sizes from 364U to 445U. Punched for easy insertion in notebooks, the bulletin explains how to quickly compare dimensions of the Reliance series C motors with those of the series D line (new NEMA sizes).

EARTHMOVING—Euclid Div., General Motors Corp., Cleveland, Ohio, has written a booklet entitled "Design For a New Era in Earthmoving. . . ." It is a 24-p catalog featuring the Model TS-24 Euclid "Twin" scraper. It gives diagrams and on-the-job photos, and also covers design, operation and performance.

LUBRICANTS — Lincoln Engineering Co., St. Louis, Mo., has announced a catalog on the complete line of Lincoln lubricant application equipment. This manual is filled with dimension drawings—many in actual size. Also in the book are features of lubrication fittings, grease guns, and accessories.

DUST COLLECTION — Ducon Co., Inc., Mineola, N.Y. has a 6-p bulletin on dust-collection equipment. The new book describes and illustrates the firm's complete line of wet-and dry-type dust collectors and auxiliary equipment, including cyclones, centrifugal and dynamic washers, dust and fiber filters, discharge gates and trickle valves.

LARGE INDUCTION MOTOR—Louis Allis Co., Milwaukee, Wis., has published a new 16-p bulletin, No. 1950,

**JOE'S
DOWN
AND OUT**

an ordinary tire quit on the job

**but JIM'S
UP AND
DOING...**

with U.S. ROYAL Mine Cushion TIRES

YOU SHOULD KNOW these great U. S. Royals have moved *millions* of tons with *no* downtime due to tire failure. Yet they cost no more. Write J. A. Watson, Mgr., Industrial Tires *now!*



**United
States
Rubber**

Rocketteller Center, New York 20, N. Y.



Every dipper-full weighs 80 tons! The "River Queen", largest power shovel ever to come out of the Bucyrus-Erie shops, can move over 33,000 tons of earth and rock overburden in a single 8-hour day—enough to fill a freight train six miles long. The "River Queen" flies the colors of the River Queen Coal Company near Greenville, Kentucky, a joint strip-mining venture of the W. G. Duncan Coal Company and the Peabody Coal Company and operated by Peabody.

OKOCORD keeps the big ones digging!

She's a big one, all right. Towering as high as a 13-story building, tipping the scales at over twenty-four hundred tons, the "River Queen" is one of the largest pieces of mobile land machinery ever sent into action. And she's powered by a 3-inch, 3/c portable Okocord cable.

She's a hungry one, too! She gobbles up 55 cubic yards of dirt and crushed rock in every bite. She draws 4,160 volts of electricity from her Okocord cable to run the 15 huge electric motors that give her the muscle power to move, wheel and dig.

She needs that power every second—or two and a half million dollars worth of equipment is immobilized. That's why Okocord trailing cable was selected to stand up to constant reeling and unreeling . . . to twisting and scraping as it's dragged over rocky ground . . . to being left for days on end in water and muck.

You should know about Okocord, too, whether you operate the world's largest power shovel or a simple portable drill. It's so easy—just write for Bulletin CA-1108, The Okonite Company, Passaic, N. J.



where there's electrical power...there's **OKONITE CABLE**

Equipment News (Continued)

on large induction motors. This bulletin gives detailed data on a full line of motors in ratings from 150 to 1,250 hp. Motors of this size, says the firm, fill the demands imposed by ever larger process machinery and industrial operations, such as refinery pumps, compressors, rock crushers, etc.

QUICK COUPLER—Jordan Industrial Sales Div. of OPW Corp., Cincinnati, Ohio, offers new, 8-p catalog F-10-R, giving complete information on OPW-

Jordan Kamlok quick couplers. Kamloks are used on hoses, piping, and equipment. A tight fit is said to be made in seconds by sliding coupler halves together, then pressing cam arms. The leaflet describes Kamlok features, applications, materials, styles and sizes.

WASTE AND WATER—Link-Belt Co., Chicago, Ill., has produced a new motion picture, "Pure and Simple," on sewage and water problems. It shows how these water problems are solved by installations at chemical plants, refineries, and manufacturing plants. Details

of various systems are dramatized by animation. The film runs for 19 min and is available upon request for free showing to those firms that have industrial waste problems.

CRUSHERS—McLanahan & Stone Corp., Hollidaysburg, Pa., makes available a new 8-p bulletin on its McLanahan Black Diamond single-roll crushers. In addition to construction and design features, the bulletin includes dimensional drawings and data on capacities and horsepower required for crushing coal.

FUSES—Monarch Electric Corp., Jamestown, N.Y., has put out a new catalog, Form 48, on Monarch fuses. It shows the recently patented "Cooling Fin" advanced design type "CK" in a large knife-blade type fuse for 450 to 600 amp. It also tells about clip clamps, plug fuses, fustats and midget renewable fuses.

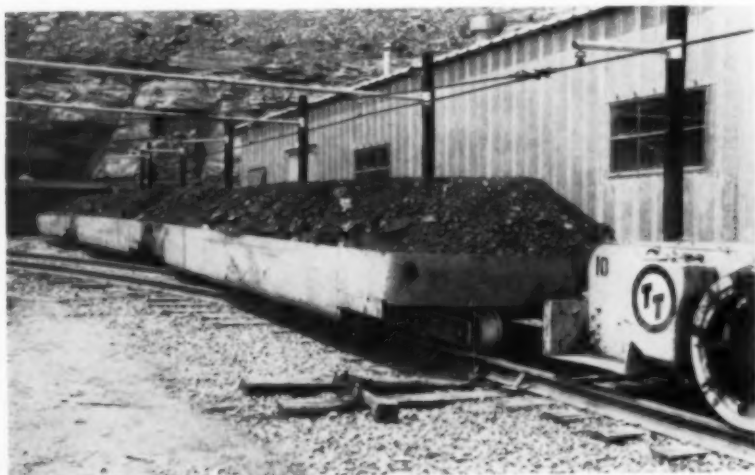
AIR COMPRESSORS—Le Roi Div., Westinghouse Air Brake Co., Milwaukee, Wis., has released Bulletin SC-1, telling about the whole line of Westinghouse unit-type and Le Roi stationary-type air compressors made by the Le Roi division. The compressors range in size from ½ to 100 hp and include both single and compounded-stage models. The booklet has photos and descriptions of seven basic models.

CARTRIDGE LUBRICANTS—Alpha-Molykote Corp., Stamford, Conn., has drawn up Bulletin 114, covering the use of a Molykote, Type BR-2 lubricant, packaged in cartridges and applied from a grease gun. It is a lithium soap base heavy-duty lubricant which combines calcium and sodium soap thickeners with the amazing lubricity of molybdenum disulfide powder, according to the firm. It has an operating range of -30 F to 250 F add up to 350 F for short periods.

STEEL-TOE SHOES—Lehigh Safety Shoe Co., Emmaus, Pa., offers a 16-p catalog listing details on 72 different safety-shoe styles for men and women; it includes ideas on how to select the best sole and construction for different industrial jobs and hazards.

ROAD MACHINERY—Huber-Warco Co., Marion, Ohio, offers a brochure covering their line of road machinery products. This book outlines the bonus features of Huber-Warco motor graders, tandem and three-wheel rollers and the maintainer. Detailed photographs illustrate inner-working parts of the equipment.

ANY SPEED—Oilgear Co., Milwaukee 4, Wis., has released a 32-p book on



haulage capacity...

Place: Eunice, W. Va.
No. 8 Mine

Operator: Truax-Traer Coal Co.

Car Dimensions: Length: 24' 6"
Width: 8'
Height: 24" (above rails)
Weight: 8600# (empty)

Capacity: 262 cu. ft. (level load)
392 cu. ft. (crown load)

where can you match it?

Since 1915—
Pioneers in
haulage equipment



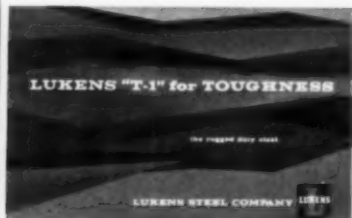


Where the going gets rough...

get tough

with Lukens "T-1" Steel!

TRADE MARK



WRITE FOR THIS BOOKLET TODAY



■ Wherever rock and gravel, coal and ores come in violent contact with machine and equipment parts, Lukens "T-1" steel—especially extra tough 321 min. BHN quality—fights back at wear and abrasion with spectacular success.

It is readily fabricated. You can form or weld it in the field or shop, from stock plate sizes immediately available. It can be used to replace or repair worn bucket teeth, truck and mine car bodies or liners, dozer blades, dipper sticks, crusher teeth, chutes, and many other parts.

Far stronger for its gage than conventional steel, it requires less metal to do equivalent jobs. It remains tough even at sub-zero temperatures.

Contact your nearest warehouse listed below, or write Manager, Marketing Service, 138 Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania. Ask for special bulletin, "Lukens 'T-1' for Toughness."

WAREHOUSES

Ashland, Kentucky, Mansbach Steel Co.,
19th St. & River Front
Baltimore 2, Maryland, Wm. G. Wetherall,
Inc., 317 President Street
Birmingham 2, Alabama, O'Neal Steel,
Inc., P. O. Box 2623

Cleveland 6, Ohio, Mills-Wolf Steel Co.,
10006 Carnegie Avenue
Los Angeles 33, California, The R. J. M.
Company, 238 Mission Rd.
Montreal, Quebec, Can., Drummond,
McCall & Co., Ltd., 930 Wellington St.

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Fits more needs,
BETTER
than any other
Rail Bond

EVERLAST
Super-
WELD

Here's why:

1. The Everlast is the most adaptable of power rail bonds. The reversible feature permits installation under all conditions.
2. Super-Weld assures highest tensile strength of weld—as strong as the conductor itself. It provides maximum conductivity and uniformity of weld *without* distortion or oxidation of copper strand.
3. No special clamps or tools are required for installation. Quickly positioned with a few hammer taps for easy welding, it fits snugly, gives maximum terminal-rail contact and abundant welding area. Cannot be damaged by welder's arc.
4. Design facilitates quick, easy recovery of rail bond without damage. Bond is recovered with terminals intact and may be used over and over again.
5. Available in capacities and lengths to meet your requirements.

For full information, write for new bulletin.



PENN MACHINE CO.

JOHNSTOWN, PA.

Mt. Hope,
W. Va.

Union Trust Building, Pittsburgh, Pa.

Huntington,
W. Va.



Equipment News (Continued)

Oilgear "Any-Speed" drives. The bulletin explains advantages, operation and characteristics of the firm's drive systems and illustrates these systems with typical performance curves and block diagrams on different types of rotary applications.

FIRELESS CLEANER—Kelite Corp., Berkeley Heights, N. J., offers Bulletin No. P-7578, describing the Kelite "Fireless" steam cleaner. The bulletin tells how the machine uses live steam from an existing steam supply, giving good cleaning power of high-volume steam. It adds that the Kelite "Fireless" is very useful in hazardous locations where an open flame is not permitted, but where a steam supply exists.

TRACTOR SCRAPERS—Clark Equipment Co., Construction Machinery Div., Benton Harbor, Mich., announces its new 24-p catalog describing "Michigan" Models 110, 210 and 310 tractor scrapers. The color pamphlet gives big, clear pictures, and simple text illustrates and describes features. The catalog explains how simple, fast-acting hydraulic controls regulate all scraper operations.

CONVEYOR CHAIN—Browning Mfg. Co., Maysville, Ky., has out a sheet about a new and simplified design attributed to their electrolyzed "Flat-Veyor," a conveyor chain. It is supposed to have a much higher tensile strength than stainless steel, and it is said that the special chain will withstand greater loads and higher speeds. The leaflet, No. CD-103, has all the information.

CUTTING MATERIAL—Firth Sterling, Inc., Pittsburgh 30, Pa., has published a bulletin on Firthite WF, a new Cermet cutting material that contains neither tungsten nor cobalt. A tool-life section features a cutting speed versus tool-life graph. A full page is devoted to case histories.

ALLIS-CHALMERS Mfg. Co., Milwaukee 1, Wis., tells of construction and mechanical features in their weather-protected motors in Booklet No. 05B787-4C. The motors can be obtained with "Silco-Flex," all silicone-rubber insulating system which produces stator coils that are impervious to moisture and other air-borne contaminants, according to the firm.

HEAVY-DUTY EXCAVATOR—Koehring Co., Milwaukee 16, Wis., has released a booklet on the crawler-mounted, Model 805 excavator, recently placed into production. The 805 was designed to fill a production gap on construction and material-handling jobs. It can be used as a 2-cu yd shovel, 2- to 3- cu yd dragline or clamshell, or a 52-ton lift crane.



Companions in Coal Production

While a Marion 7800 walking dragline (background) strips overburden, its companion, a Marion 4161 shovel, loads coal at a vast bituminous stripping operation in southern Indiana. Overburden of clay and shale measures 40 to 85 feet in depth, and the coal seam averages six feet in depth. Swinging a 35-yard bucket on a 195-foot boom, the big walker moves an average of 550,000 yards per month. The electrically-powered loading shovel has a 7½-yard dipper.

CONSULT

MARION

MINING SPECIALISTS

for lowest costs on your property!



The smaller Marions handle big tonnages, too! At a Canadian ilmenite smelter, this 111-M clamshell uses a 3-yard bucket for ore and a 6-yard bucket for coal.

MARION POWER SHOVEL COMPANY—MARION, OHIO, U. S. A.

A Division of Universal Marion Corporation

Among the Manufacturers

Modern Plant

Construction has started on a 289,000-sq ft addition to the General Motors Detroit Diesel Engine Div. plant in Detroit.

The new building, which will house all final assembly, testing, and shipping facilities for Detroit Diesel, should be completed by next May it is reported. A company spokesman has said that manufacturing methods, made possible by the expansion, will make GM Diesel the most modern plant of its kind today.

More Space

Chester Cable Corp., a subsidiary of Miami Copper Co., has announced completion of three steps of their plant and facilities expansion.

Total available plant area is now 200,000 sq ft of floor space, an increase of 75,000 sq ft. The three phases just completed include: increased production capacity which necessitated additional storage area for raw materials as well as added production machinery and new processes; enlargement of laboratory

personnel and equipment for research; and the setting up of larger experimental sections for testing of materials and finished products. The plant is now in full production.

Going Up

An expansion program by Joseph T. Ryerson & Son, Inc., in St. Louis, Mo., has progressed beyond the steel erection stage, it is reported.

The company is erecting a 2-span warehouse building to contain 36,000 sq ft. When construction is completed, the company will have additional space totalling 67,200 ft. The new facilities are expected to be ready by spring of this year.

North American Coal Corp. has announced that they are organizing a joint venture with Strategic Materials Corp. of Buffalo, under the name Strategic North American Corp.

The corporation will work at developing and exploiting a new process for recovery of high-grade alumina from low

grade ores and coal mine wastes. The venture group is empowered to build and operate plants for the production of alumina and aluminum sulfate, and to license the process.

The Coal Div. of Eastern Gas & Fuel Associates announces a reorganization of its Headquarters Engineering Dept.

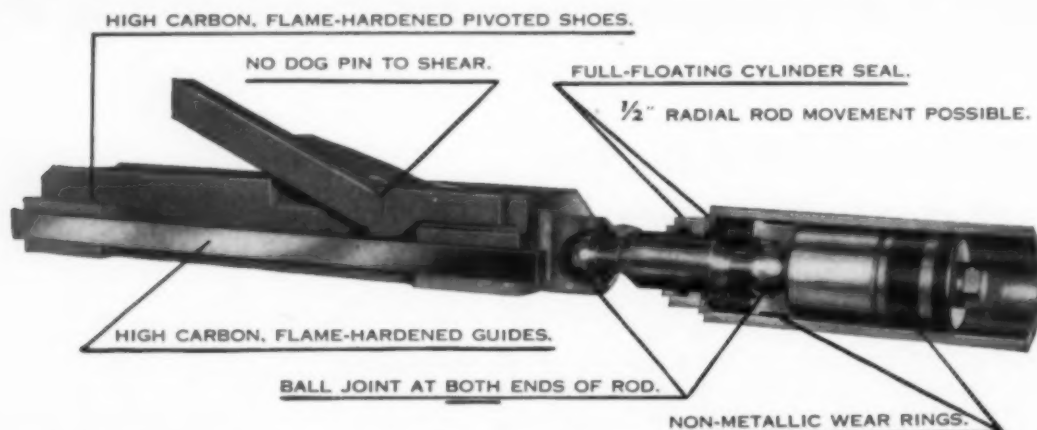
The new setup, designed to handle problems arising from expanding mechanization and technology, will separate handling of special and long-range problems from detailed engineering problems which arise daily, according to the firm. At first, the department will be made up of six sections: mine engineering, preparation, property, electrical, ventilation, and shaft sinking and repairs.

American Air Filter Co. Inc., has formally finished, through an exchange of stock, acquisition of Kennard Corp., St. Louis manufacturer of heating and cooling coils, and heating, ventilating and cooling units.

AAF president, W. G. Frank, revealed that American Air Filter acquired 95,525

Here's why STAMLERs are BEST!

STAMLER EXCLUSIVE PATENTED FEATURES PROVEN AND UNCHANGED FOR 8 YEARS!



Remember... STAMLER has built
NOTHING BUT Car Spotters since 1949!
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SCHROEDER BROTHERS, Exclusive Eastern Sales Agent, Pittsburgh, Pennsylvania • SALMON & CO., Birmingham, Alabama
UNION INDUSTRIAL CORP., Carlsbad, New Mexico • WESTERN SALES ENGINEERING CO., Salt Lake City, Utah

A MILE - STONE OF ..

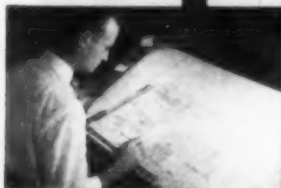
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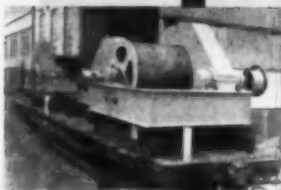
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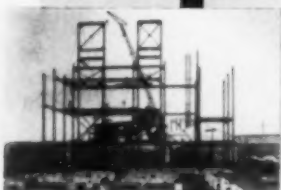
RESEARCH



ENGINEERING



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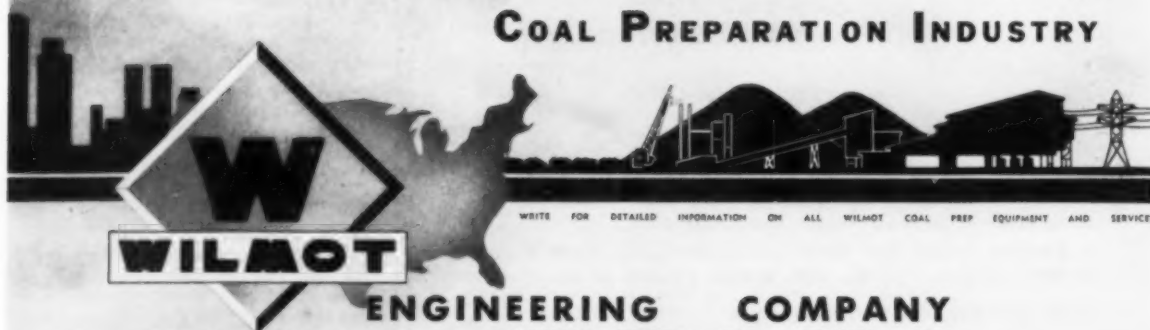


CONSTRUCTION

SERVICES

TO THE

COAL PREPARATION INDUSTRY



WILMOT

ENGINEERING COMPANY

WHITE HAVEN, PA., PHONE 4311

WRITE FOR DETAILED INFORMATION ON ALL WILMOT COAL PREP EQUIPMENT AND SERVICES

Manufacturers (Continued)

shares of Kennard common stock, in return for 20,046 shares of AAF common stock.

Reich Bros Mfg. Co., Inc., announces establishment of a western branch office at 1201 E. 8th St., Los Angeles 21, Cal.

The firm's factory representative can be reached there in connection with sales and service of Reich rotary drills.

Dorr-Oliver Inc., announces the expansion of Chemical Pump and Equip-

ment Corp.'s exclusive process-pump distributorship to include the greater Chicago and greater Cincinnati industrial areas.

These territories, which include sections of Iowa, Illinois, Kentucky and Ohio, are, in addition to the northern Ohio region, served by Chemical Pump Corp. for Dorr-Oliver over the past 18 mo.

Mountaineer Carbon Co., one of the newer Ohio Valley industries, has completed construction of its plant and is currently testing facilities, according to

Pittsburgh Consolidation Coal Co., which helped to build the Mountaineer firm.

Construction on the new firm, which is jointly owned by Standard Oil Co., of Ohio, was begun in 1956. It is reported that operation of the plant is still some months away. The plant is located next to Ohio Power Co.'s Kammer plant and Hanna Coal Co.'s Ireland mine.

Ben F. Heyward has been appointed assistant sales manager for the New Orleans district of United States Steel's Tennessee Coal & Iron Div.

He was formerly sales representative in the Nashville area and has been with U. S. Steel since 1939.

Herbert Grossman has been named assistant sales manager—commercial activities, and Richard Harap has been named sales manager—product activities, for Burndy Corp.

Mr. Grossman has been with the firm for 16 yr and Mr. Harap has been with it since 1948.

Darrell E. Albert, who joined Mine Safety Appliance Co. in 1950 as a sales engineer, has been appointed product line manager for respirators and gas masks.

For the past four years, Mr. Albert has been sales engineer in Birmingham, Ala. Prior to that he had been assigned to the Pittsburgh district in a similar capacity.

Burton Schellenbach has been named vice president-sales, for H. K. Porter Co., Inc.

Mr. Schellenbach, a veteran of nearly 45 yr in marketing, will make his headquarters in the firm's Pittsburgh offices. He has had heavy experience in sales and marketing and has served as a member of the Porter board of directors.

William Foster and Robert B. Wertz have been appointed senior general attorneys of United States Steel Corp.

Mr. Foster is a graduate of Princeton University and has served as chief of the legal section on ammunition for the Pittsburgh Ordnance District. Mr. Wertz, a graduate of Harvard, was in private practice before joining U. S. Steel in 1943.

Dr. Sydney Steele has been named director of public relations for Atlas Powder Co.

Before joining Atlas, Dr. Steele served for one year as sales promotion manager at Fischer & Porter.; for 14 yr with Du Pont Co. at Niagara Falls, N.Y. and in Wilmington in engineering production, development and sales work.

George M. Thursby has been appointed administrative vice president-

**NEW SPEED AND DRILLING ECONOMY
WITH THE NEW IMPROVED**

Parmanco

MODEL CD-51-57

COAL AND CLAY DRILL



- Augers Rotated by Vickers 21.5 H.P. Fluid Motor with Hydraulic Feed Finger Tip Controlled
- Cutting Shield And Guide Completely Automatic
- Drill Powered By 65 H.P. Water Cooled Motor.

Jack Foehrer, Pit Foreman says

"THE PARIS DRILL IS THE BEST WE HAVE EVER USED."

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PARIS MANUFACTURING CO.

PARIS, ILLINOIS

employee relations, of U. S. Steel Corp.

A native of Pittsburgh, Mr. Thursby received his education in Pittsburgh and at Duquesne University. He began his career with U. S. Steel in 1931 with the National Mining Co. Most recently, he has been vice president—industrial relations administration of the firm.

Formsprag Co., manufacturer of over-running clutches, has obtained exclusive sales rights throughout the United States to the Rawson clutch-coupling, manufactured by O. S. Walker Co., Inc.

The Rawson clutch-coupling is widely used in industry and finds its greatest application to the starting of motors under no-load conditions, where it eliminates the need for larger motors or for special high-torque motors and controls for starting only.

W. J. Klein, vice president of Allis-Chalmers Mfg. Co. is now director of sales promotion, Tractor Group.

He will direct advertising, sales promotion and marketing activities for products of the Farm Equipment, Construction Machinery, and Engine-Material Handling divisions.

Robert D. Allison has been named general superintendent of the Pittsburgh steel plant, Joseph T. Ryerson & Son, Inc.

Allison began his career with Ryerson in 1949 in the service department of its Chicago plant. Recently, he served as night superintendent.

Theodore K. Feyder, formerly sales engineer for Mine Safety Appliances Co., has been transferred to the Pittsburgh district sales office in a similar capacity.

Mr. Feyder is a member of the American Society of Safety Engineers and was with Winchester Repeating Arms Co. prior to joining Mine Safety.

J. R. Brandon has been appointed manager of the newly organized field service department, Industrial Products Div., Hewitt-Robins, Inc.

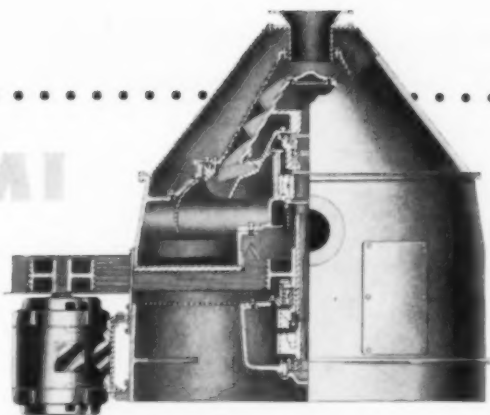
Mr. Brandon will be located in Stamford, Conn., and will work to unify and strengthen field service activities. He has been with Hewitt-Robins since 1952 as a service engineer, and manager of the service department in Passaic, N. J.

James A. Nissen has been named general sales manager at Denver Equipment Co.

He has been associated in mining, milling, mill design and construction for many years. Most recently, he was a DECO dealer in San Francisco, Cal.

John E. Kalinka, president of Roberts and Schaefer Co. has retired. Robert

CMI



A partial "Open House" to disclose

the inner workings of a very fine Coal Dryer.

Naturally it's a CMI Dryer. This particular model is the EB-36. A new brochure (#EB-36), which is yours for the asking, tells why its performance represents real automation in drying coal by continuous centrifugal force.

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INCORPORATED

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QCF Load-support MINE CAR WHEELS

Quick-chilling after casting gives QCF Chilled Tread Car Wheels extra resistance to abrasion and wear, gives you real economy through long service life. Gray iron center costs less to mount, reduces vibration and effects of stress concentration. Curved plates support tread at load center: minimize damage to treads.



Cross Section of QCF "Load Support" Mine Car Wheel showing: (1) uniform depth of hardening, (2) extra heavy overhang, (3) support at center of tread.



For further information, just ask your QCF representative.

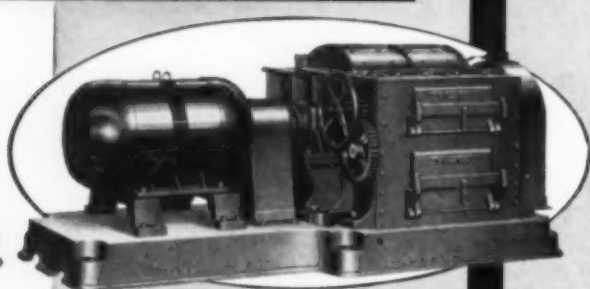
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Sales Offices: New York • Chicago • St. Louis • Cleveland • Washington • Philadelphia • San Francisco
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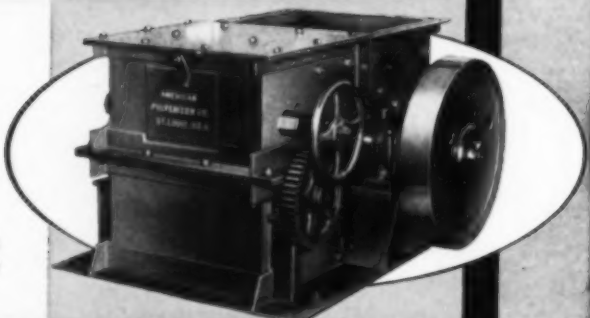
When You Figure . . .

AC Series
capacities to
800 TPH



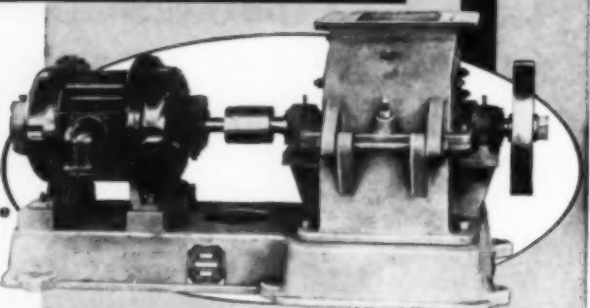
Reduction Cost Per Ton . . .

WC Series
capacities to
90 TPH



the Best Answers* . . .

**Coal Sample
Crushers**
capacities to
2000 lbs.
Per Hr.



Come from *American* Ring Coal Crushers

*In a recent independent survey, it was found that American Crushers reduced over 61,000,000 tons of coal at a parts replacement cost (including standby parts) of less than 1/10th of 1¢ per ton.

THERE CAN BE NO BETTER PROOF OF AMERICAN QUALITY!

American
PULVERIZER COMPANY

WRITE for Literature on These Crushers

Designers and Manufacturers of Ring Crushers and Pulverizers

1119 MACKLIND AVE. • ST. LOUIS 10, MO.

Manufacturers (Continued)

Azborowski was named president and Eugene V. Kipp, executive vice president.

James E. Duff has joined Joy Mfg. Co. as general sales manager of the Electrical Products Div.

A graduate of the New York Maritime Academy, and from Lehigh University with a B. S. degree in Industrial Engineering, he has the distinction of being the youngest American to earn a first engineer's license for unlimited horsepower.

John M. Murray has been appointed sales manager for Simplex Wire & Cable Co.

Mr. Murray has been assistant sales manager since 1952. He is a member of the AIEE and a past chairman of that organization's Boston chapter.

Frank Fisher, formerly vice president and general manager of Rheem Automotive Co., has been appointed president and general manager of the Atkins Saw Div. of Borg-Warner Corp.

Reared in Connersville, Ind. and graduated from Connersville High School, Mr. Fisher began his industrial career in his home state, rising to executive positions in several Indiana manufacturing firms.

Paul J. Foley has been named general manager-resale for the marketing division of Worthington Corp.

He will be in charge of the sale of franchised products, including vertical turbine and standard pumps, construction equipment, air-cooled compressors, mechanical power transmission equipment, etc.

Arthur P. Hunter is now supervisor-cement machinery sales, for Allis-Chalmers Mfg. Co.

Hunter has been an application engineer in cement machinery sales since 1952. A Chemical Engineering graduate of Purdue University, he has been associated with Allis-Chalmers processing machinery department since 1946.

Walter F. Schulten has been given responsibility for Pittsburgh Consolidation Coal Co. relations with governmental agencies on transportation.

Mr. Schulten came to Pittsburgh Coal in 1940 as general traffic manager and was elected a vice president in 1951. The firm has also announced promotion of Jack E. Henderson to general traffic manager. In his new position Mr. Henderson will have complete charge of all traffic activities at Pittsburgh Consol and its subsidiaries. Mr. Henderson has been with Pittsburgh Coal since 1944.

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the coal industry should take advantage of
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and knowledge of the consultant and profit
by such use.

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HINGED 500X
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UNDERGROUND COAL MINING

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NYLON CABLE HINGE PIN . . .

- ✓ Easy to insert or pull out . . . will not migrate.
- ✓ Smooth wearing surface—nylon is self-lubricating.
- ✓ Will not unravel when cut.

Start now to equip your extension belts with FLEXCO 500X "SEPARABLE" FASTENERS (new FLEXCO HINGED 500X FASTENERS are interchangeable with old HF 500 Fasteners).

HANDY PACKAGE



Carton contains one complete belt joint—fasteners, pin, bolts and nuts.

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65 Bay City Shovel, 1¼ yd.
HD-20 Hyd. Dozer w/Cable Cont. Unit
D-7 Cat Dozer
TD-18A International Dozer
AD-3 Motor Grader
HM-28 Hough Payloader
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200 Amp. Lincoln Arc Welder
Gardner-Denver Air Comp. 1056 FM @ 125 PSI.

Sullivan Core Drill, Hyd. Rotary Type, Complete with 210 Ft. "A" Rod & 60 Ft. "N" Rod, "A" & "N" Core Barrel, Diamond Core Bits, Carbide Bits, etc. Mounted on New Dodge Tandem Truck W/Power Steer, Drill Rig Self Contained W/Built in 500 Gal. Water Tank. Model 106 McCarthy Vertical Rock Drill W/Augers & Tools.
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New Hossfeld Prospect Drill—Never Un-crated Shovel Front for 1201 Lima, 3 yd. Good Condition.
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Two 80 ton and one 25 ton G.E. Diesel-Electric Locomotives. Like New—built 1955. 42" track gauge, will alter to suit.
One Ingersoll-Rand Motor Blower, Type FS—never used.
Four Blast Hole Drills, Bucyrus Erie 42 T Electric, with accessories. In good operating condition.—Bargain price.

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Lansford, Pennsylvania
Lansford 1619

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25,000 acres coal mining leases. 3 workable seams. Domestic coal tippable with good market. Railroad sidings with crushers and loading facilities. Two firm contracts for steam coal. Stripping equipment and truck mines now working on property. A going business. (Equipment available for sale also if desired). Owner's health and other interests reason for selling. Ideal for experienced coal company with proper finances that needs new territory. Write for appointment and give credit references. Promoters not wanted.

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Mine superintendent with twenty years experience in all phases of coal mining. Write P. O. Box 132, Charleston, W. Va.

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JOY EQUIPMENT—REBUILT

- 1-Joy BAE Super 14BU Loader, rebuilt.
- 3-Joy 14-BU Loaders, low pedestal, 7AE.
- 2-Joy 14-BU Loaders, medium pedestal, 7BDE.
- 1-Joy 14-BU Loader, high pedestal, 7DE.
- 2-Joy 12-BU Loaders, 9E, latest type.
- 1-Joy 12-BU Loader, 220 volt AC.
- 1-Joy 20-BU Loader, latest type.
- 1-Joy 11-BU Loader, latest type.
- 2-Joy 8-BU Loaders, 230 volt DC.
- 1-Joy 8-BU Loader, 34" overall height.
- 2-Joy 8-BU Loaders, 220 volt AC.
- 1-Joy curved Bar Head, complete.
- 2-Reliance 18-J Motors, 10 H.P.
- 6-Reliance 24-J Motors, 7 1/2 H.P.
- 4-Reliance 10-J Motors, 5 H.P.
- 20-9-J Motors, 4 H.P.
- 6-New Wheel Units for Joy 6 SC Shuttle Car.
- 1-Goodman 660 Loader on cats, excellent.
- 3-Goodman 665 Loaders on cats, latest type.
- 2-BSC Shuttle Cars, latest, low vein.
- 1-Joy 6 SC Shuttle Cars, rebuilt.
- 1-Joy 3 SC Shuttle Car, rebuilt.
- 2-Joy 32E9 Shuttle Cars.
- 2-Joy 32E10 Shuttle Cars, rebuilt.
- 2-Joy 32E13 Shuttle Cars, rebuilt.
- 1-Joy 32E16 Shuttle Car, rebuilt.
- 2-Joy 42E16 Shuttle Cars, rebuilt.
- 1-Joy T-2-5 low pan Cat Truck.
- 2-Joy T-2-6 low pan Cat Trucks with reel.
- 2-Joy T-1 Standard Cat Trucks, 220 AC.
- 1-Joy T-1 Standard Cat Truck, 230 DC.
- 1-Joy 11-B Cutting Machines, like new.
- 1-Joy 7-B Cutting Machine, like new.
- 3-Joy CD-22 Drills, like new.
- 2-Goodman 512 Machines, with Bugbusters.
- 1-Goodman Machine on Cats, 31" high. All hydraulic.
- 1-Goodman 512 cutting machine, perfect.
- 2-Goodman 512 cutting machines, 220 volt AC.
- 1-Leonore low vein Machine Carrier on rubber.
- 2-Jeffrey 70 URB's rubber-tired Cutters, Universal head, perfect condition.
- 1-Joy 11RU, rubber tired Cutter with Bugbusters, Universal head and dual tires.
- 2-Jeffrey, 29UC Cutting Machines, Universal head, cuts anywhere in seam, 38" high, on cats, 230 volt DC.

LOCOMOTIVES

- 3-Jeffrey 13 ton, type MH-110, 36", 42" and 44" Ga.
- 2-Jeffrey 10 ton, type MH-110, 42" and 44" Ga.
- 1-Jeffrey MH-124, 6 ton, 24" overall height.
- 12-Jeffrey, 6 ton, type MH-88, 42", 44" and 48" Ga.
- 2-Jeffrey, 8 ton, type MH-100, 2" armor plate frames.
- 1-Jeffrey 6 ton, type 2186, 22" above rail.
- 3-Jeffrey, 4 ton, type MH-96, 42", 44" and 48" Ga.
- 1-G.E., 4 ton, type 825 Locomotive, 22" high.
- 10-G.E., 6 ton, types 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
- 1-G.E., 8 ton, type 822 Locomotive, 44" Ga.
- 3-G.E., 10 ton, type 809 Locomotive, 42", 44" and 48" Ga.
- 2-Goodman, type 33, 6 ton 44" and 48" Ga.
- 3-Goodman, 8 ton, type 32A, 36", 44" and 48" Ga.
- 3-Westinghouse, type 902, 4 ton, 42" and 48" Ga.
- 2-Westinghouse, type 904, 6 ton, 44" and 48" Ga.
- 2-Westinghouse, type 906, 44" and 48" Ga.
- 2-Westinghouse, type 907, 10 ton, 44" and 48" Ga.
- 2-Diesel Locomotives, 6 and 10 tons, Excellent.
- 9-Jeffrey MH-78 Locomotive Units, cheap.
- 4-Jeffrey MH-88 Locomotive Units, real bargains.
- 6-Jeffrey MH-100 Locomotive Units, reasonable.
- Locomotive Trucks and Spare Armatures for all the above.

TIPPLE EQUIPMENT

- 1-Cedar Rapids portable super Screening Plant.
- 1-Allis-Chalmers 5'x14" Ripplo Vibrator.
- 1-3'x16" Robbins double deck Vibrator.
- 1-4'x10" Robbins Gyrex Vibrator.
- 1-Roberts & Schaefer tandem Hydro-Separator.
- Belt Loading Booms.
- 1-Robins Car Shakedown.
- 10-Crushers, various sizes.
- Feeders, Drag Conveyors and Loading Booms.

CUTTING MACHINES

- 2-Jeffrey 70 URB Cutters, rubber-tired, Universal Head, low vein.
- 3-Jeffrey 29UC Universal Machines on Cats.
- 1-Joy rubber-tired 11RU Cutter with bugbusters.
- 1-Goodman on cats, 31" overall height.
- 1-Baby Goodman 212, rebuilt, 230 volt DC.
- 1-Baby Goodman 212, rebuilt, 220 volt, 3 phase AC.
- 1-Goodman 312, 18" high.
- 2-Goodman 512's with Bugbusters, like new.
- 4-Goodman 512's, rebuilt, or as removed from service.
- 2-Joy 11B Cutting Machines, rebuilt.
- 2-Goodman 512 Cutting Machines, 220 volt AC.
- 2-Goodman 12AA's and 112AA's.
- 2-Goodman 324 Slabbers.
- 2-Goodman 724 Slabbers.
- 2-Jeffrey 35L's, like new, 17" high.
- 2-Jeffrey 35L's, on low vein trucks.
- 1-Jeffrey 35L, 220 volt AC.
- 15-Jeffrey 13B's and 35B's.
- 2-Jeffrey 29B's on track.
- 2-Jeffrey 29C's track mounted.
- 1-Jeffrey 29L on track, perfect.
- 2-Sullivan CR-10's, 15" high.

LOADING MACHINES

- 16-Loaders, all types.
- 2-Jeffrey 61 CIR's on rubber, 26".
- 3-Jeffrey L-500 Loaders.
- 2-Johns Whaley No. 3 Automat Loaders.
- 2-Clarkson Loaders, 26" above rail.

CONVEYORS

- 2-Jeffrey 52-B, 30" Conveyors, 1500' each, Excellent.
- 4-Joy 30" Underground Belt Conveyors, 500' to 2000' each, Excellent.
- 1-Barber Greene 30" Belt Conveyor, 1000', Excellent.
- 1-Robins 30" Belt Conveyor, 1000'.
- 2-Jeffrey 52-B, 28" Conveyors, 1200' onsh, 3000' Conveyor Belt, 30".
- 2-GEW Elevating Conveyors.
- 2-GEW 15" Room Conveyors, 300 ft.
- 2-Joy 13" Room Conveyors, 300'.
- 2-Joy 20" Conveyors, 300'.
- 4-Joy Ladel UN-17 Shakers.
- 10-Goodman G-12's and G-15 Shakers.
- 3-Long 408 DBH 15" Chain Conveyors, 25 H.P. Motors, new.

CONVERTERS AND DIESEL PLANTS

- 1-50KW, G.E. TC-6, 275 volt Rotary Converter.
- 2-100KW, G.E. TCC-6's, 275 volt, Rotary Converters.
- 1-150KW, G.E. HCC-6, 275 volt, Rotary Converter.
- 1-150KW, 6 phase, Allis-Chalmers Rotary Converter, 275 volt DC, perfect.
- 1-200KW Allis-Chalmers Rotary Converter, 6 phase, 275 DC, perfect.
- 1-200KW, G.E. HCC-6 Rotary Converter, 275 volt DC.

- 3-300KW, G.E. HCC-6 Rotary Converters, 275 DC.
- 3-300KW Westinghouse, 6 phase, Rotary Converters, 275 volt DC.
- 1-375KW Westinghouse Rotary Converter, 275 volt, 2-500KW Westinghouse Rotary Converters, 275 volt DC.
- 1-200KW Westinghouse Rotary Converter, 275 DC, (all the above with 6900/13000 and/or 2300/4000 primary transformers).
- 2-150KW MG Sets, General Electric and Westinghouse.
- 1-200KW MG Set, Westinghouse, rebuilt.
- 1-200KW MG Set, General Electric, perfect.
- 2-150KW Allis-Chalmers MG Sets, 275 DC volt, excellent, 220-400 AC volt.
- 1-300KW Westinghouse, 600 volt MG Set, rebuilt.
- 2-300KW Westinghouse 600 volt, 6 phase, Rotary Converters.
- 4-300KW Westinghouse, 600 volt, DC, 6 phase, Rotary Converters.
- 1-500KW HCC-6 Rotary Converter, 6 phase, 600 volt DC.
- 1-Cummins 125 KW, Diesel with 230 volt DC Generator.
- 1-G.M.C. Diesel Plant with 60 KW Generator, 275 volt DC.
- 1-G.M.C. Diesel Plant with 85 KW Generator, 275 volt DC.
- 1-D-13,000 Caterpillar Diesel with 75 KW Generator, 275 volt DC.
- 1-Allis-Chalmers Natural Gas Engine with 100KW Generator, 275 volt DC.
- 1-700 H.P. Shaft Hoist, complete.
- Complete steam plant, will sell all or any part.
- Boilers, like new, 1100 H.P. and 500 H.P. Also transformers, turbines, etc.
- 1-Complete Tipple with Cleaning Plant.

MISCELLANEOUS

- Battery Supply Tractors, rubber tired.
- 3-Low Vien Rubber Tired Elevators 15' Long 24" Wide Belt.
- 1-Contrell Air Compressor on rubber tires.
- 10-Air Compressors, 1 H.P. to 40 H.P.
- 40-Mine Pumps, all types.
- 1-Differential 40 Passenger Man-Trip Car.
- 6-MSA Rock Dusters.
- 1-American Mine Door Track Cleaner—new.
- 2-Phillips Carriers, 44" and 48" Ga.
- 2-Barber Greene self propelled Bucket Elevators, Pipe, Plastic, Steel, Transit, all sizes 1" to 6".
- 45 Mine Cars, drop bottom, 42" Ga.
- 30 Mine Cars, drop bottom, 44" Ga.
- 100 Mine Cars, 18" high, end dump, 44" Ga.
- 100 Mine Cars, end dump and drop bottom, 20" high, 48" Ga.
- 1-10 ton Mine Car Scale with Recorder.
- 1-150 ton Railroad Track Scale.
- 15-Brown Fayo MHL and HG Car Spotters.
- 1-12 ton Differential Slate Larry.
- Incline Hoists, 25 to 50 H.P.
- 1-Jeffrey 8' Aerodyne Fan.
- 1-Jeffrey 8' Aerodyne Fan.
- 1-Storage Tank, 4,000 Gallon.
- 1-Storage Tank, 12,000 Gallon.
- 10,000 Five Gallon G. I. Cans, screw lids.
- 800 tons Relaying Rail 23 1/2 to 80 1/2.
- 10 tons Copper Trolley and Feeder.
- 300 Transformers from 1 to 2,000 KVA, 110 to 13,000 primary volts.
- 400 Electric Motors, 3 to 250 H.P.
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LOADING MACHINES FOR SALE

- 2—148U-7BE Joy Loading Machines, 250 Volts D.C.
- 1—208U-3E Joy Loading Machine, 250 Volts D.C.
- 1—18M-16 Joy Loading Machine, 220 440 V. A.C.
- 2—128U-7E Joy Loading Machine, reconditioned
- 3—78U Joy Loaders, 250 Volt D.C.
- 1—18U Joy Loader, 250 Volt D.C.
- 2—88U Joy Loaders, 250 V. D.C.
- 2—148U-7BE Joy Loading Machines, A.C. Excellent
- 2—128U-7H Joy Loading Machines, A.C. Excellent
- 1—18U-10APE Joy Loading Machine.

SHUTTLE CARS FOR SALE

- 6—68C-3E Joy Shuttle Cars, 250 Volts D.C., elevating discharge, 4-wheel steering.
- 1—Jeffrey Shuttle Car, 4 wheel drive and steer.
- 2—68C Joy Shuttle Cars, fixed elevated discharge, disc brakes, 34" high (Matched Pair).
- 1—58C-8XE Permissible Joy Shuttle Car, equipped with disc brakes. Rebuilt.
- 2—42E-9 Joy Shuttle Cars, equipped with dual tires and cable. Excellent operating condition.
- 4—68C-7E Joy Shuttle Cars (Two Matched Pairs), modern having airplane type brakes, adjustable elevating discharge, and solid drive.
- 1—42E-15 Joy Shuttle Car, 250 Volt D.C.
- 1—42E-16 Joy Shuttle Car, 250 Volt D.C.

BELT CONVEYORS FOR SALE

- 2—Goodman type 99-3-AS36 Goodman Belt Conveyors, each 1200 long, driven by 20 40 H.P. Louis Permissible motors. Equipped with 4 ply, 42 oz. Goodyear conveyor belt.
- 1—Barber Greene 36" belt conveyor, 1200 long, complete with 40 H.P. permissible drive, 4 ply, 42 oz. rubber belting.

CHAIN CONVEYORS FOR SALE

- 3—5 H.P. Long Conveyors, 3x6 ft. long, complete with head, tail, pans and chains.
- 1—41 AM Jeffrey Chain Conveyor, complete with pans, chains, each 300' long, 10 & 15 H.P.
- 3—61 H.G. Jeffrey Face Conveyors, complete.
- 1—PT-13 Long Pan Chain Conveyor, complete with self-propelled conveyor heads, pans, and chains, 250 V. DC, permissible. Furnished with or without 148U-JRAE, 250 V. DC loading machines.
- 4—15 H.P. Long Conveyors, 300 ft. long complete with head, tail, pans & chains.

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HOISTS FOR SALE

- 1—Bruning Hoist, Model HKM, Ser. No. 6801.
- 2—Bruning Hoists Model HKL, No. 6856-6320
- 10—2 11½" Vulcan-Denver Material Hoists, complete with 3 H.P. DC Compound wound 1738 R.P.M. General Electric Motor.

CUTTING MACHINES FOR SALE

- 1—312 AA Cutting Machine, 250 Volts D.C. Excel.
- 6—33L Jeffrey Cutting Machines, 250 Volts D.C., with 7 ft. Cutter Bars, Excellent.
- 3—118U Joy Cutting Machines, 250 Volts D.C. with 9 ft. Cincinnati Bar, Chain, and Bugduster.
- 1—38 Baby Sullivan Cutting Machine, Excellent
- 1—168U Joy Cutting Machine, 220 440 Volts A.C., with reel and trailing cable.
- 2—312 Goodman Cutting Machine, 220 440 V. A.C.
- 6—78B Sullivan Joy Cutting Mach. 220 440 V. A.C.
- 1—118 Joy (Sullivan) Cutting Machines, 250 V. D.C. 7½" bar, Cincinnati Chain.
- 5—33B Jeffrey Cutters, 250 V., D.C. 8½" cutter bars
- 6—33BB Jeffrey Cutters, 250 V., D.C. 8½" cutter bars
- 1—312 CH Goodman Cutters, 250 V., D.C., permissible, 9 ft. cutter bar
- 14—312 DA Goodman Cutters, permissible 8½" bars.
- 3—12 AA Standard Goodman Cutting Machines.
- 2—7AU Sullivan Cutter, 250 volts D.C.

MOTOR GENERATORS FOR SALE

- 1—200 KW Ridgway Motor Generator Set, complete with switchgear and 1600 amp, I-T-E automatic Circuit Breaker, 2300 AC, 275 volts DC.
- 1—200 KW Ridgway Motor Generator Set, 900 RPM, complete with manual breaker, AC, and DC switchgear, 2300 400 V. AC 275 volts DC.
- 3—50 KW G. E. Motor Generator Sets, 2300 volts AC, 275 V. DC, Complete with switchgear.
- 1—50 KW Westinghouse Motor Generator Set, 2300 AC, 273 V. DC, Complete with switching gear.
- 1—150 KW Westinghouse Motor Generator Sets
- 1—2300 V. AC, 275 V. DC with switching gear.
- 1—300 KW Westinghouse Motor Generator Set, synchronous motor number 2389701, 433 KW output, 435 KVA 2200 volts, 113 amp, 1200 RPM, input power factor 8, 3 phase 60 cycle, DC generator number 2589799, 300 KW 275 volts.

- 1200 RPM, 1200 amp, S.O., 3813216 compound wound, Complete with DC panel and switchgear.
- 1—60 KW Westinghouse Generator, belt driven by 100 H.P. gas engine, complete with switchboard.

COMPRESSORS FOR SALE

- 1—WK 85 Joy Air Compressor, rubber tire mounted, self-propelled, 28½" high, model 240, maximum pressure 100 pounds. Excellent condition.
- 3—Armo Self-propelled Air Compressors, 85 R, Model 168, Capacity 176 C.F.M., with 40 H.P. Reliance Compound Motors.

RECTIFIER FOR SALE

- 1—300 KW, 275 Volt D.C., Westinghouse 2 car portable ignition rectifier, 2300 4000 4160 primary voltage, 34" high, Like New.
- 2—160 KW General Electric Stationary sealed ignifron rectifiers, 2300-4000 4160 primary and 275 volts DC secondary. Complete with switching equipment and associated controls.

COAL DRILLS FOR SALE

- 25—CP-472 Electric Coal Drills, 250 V., DC.
- 2—CD-22 Joy Coal Drills, rubber tire mounted, self-propelled, 250 volts D.C.
- 1—CD-28 Joy Coal Drill, rubber tire mounted, self-propelled, 250 Volt D.C.

LOCOMOTIVES FOR SALE

- 1—13 Ton Jeffrey Locomotive, Ser. No. 2304 Type MW-74, 42" t.g., Ht. 38". Controlled MB-36-E.
- 1—10 Ton Goodman Locomotive, Ser. No. 4371, Type 32-A-04-T, 250 V., 42" t.g., Ht. 34".
- 1—827 LD Westinghouse Locomotive, 10 ton rated, 48" track gauge, hyd. brakes & sander, dynamic brakes, contractor control & spring bumpers.

CAT TRUCKS FOR SALE

- 1—T2-3E Joy Cat Truck, 250 Volts D.C.
- 2—Joy Low Pan Cat Trucks, 250 volt D.C., rebuilt, T2-3APE Type.
- 2—Joy High Pan Cat Trucks, 250 volt D.C., rebuilt T1-3E Type.

ELEVATORS FOR SALE

- 2—Barber Greene self-propelled rubber tired elevators, 30 ft. long, gas line or electric.
- 1—Barber Greene self-propelled rubber tired elevator, 30 ft. long, self loading type.

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- 2—400 R Long Conveyors 5" Pans
- 2—Long Face Conveyors
- 1—15" Room Conveyor
- 1—12" Room Conveyor—5" Pans
- 5—G-12½ Goodman Shaker Conveyors
- 1—G-15 Goodman Shaker Conveyor
- 1—LaDel Shaker Conveyor
- 2—L-14 Goodman Shaker Conveyors with built-in Winch—20' Over-all
- 3—Size 1½ Duckbills with swivels
- 2—Size 1 Duckbills with swivels
- Shaker Conveyors can be furnished with all accessories—Size 1 Regular type or size 1½ Column type pans 10' and 13' Lengths
- DC Bonders—AC Welders
- 1—Drag Cable—DC Motor—Rubber tired
- 5 by 7 rubber-tired Mine Car—23" High
- 1—Tank Car type storage tank
- 4/0 Trolley Wire and Fittings
- 1—Jeffrey MH-88 Locomotive—Armour Plate Frame
- 1—Jeffrey MH-96 Locomotive—4 Ton
- 1—Goodman 1600-K Locomotive—3 Ton
- 1—Goodman 30-B Locomotive—5 Ton
- 1—Goodman 32-1-4T Locomotive—8 Ton
- 1—WHSE 907 Locomotive—10 Ton
- 1—GE Locomotive—6 Ton
- 3—Sullivan Hoists—Rope Speed 100' PM
- 1—HKL Car Spotting Hoist
- 2—15 KVA Capacitors
- 1—Scopmobile—Rebuilt
- 1—Slate Larry
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- Treated Power Poles—Fittings
- Shop Equipment—Chain Block—Edison Lamps
- Lamp Chargers
- Transformers—0-15-50-75 KVA
- 20 and 25# Switches—ties—plates—bars

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- Laboratory Equipment—Grinder—Pulverizer
- Railway Car Shake-out
- Jeffrey Single Roll Crusher
- Truck Scales
- Viking Hot Oil Treating Equipment
- Armatures for 212-AA Goodman
- G-15 Goodman—1600-K Goodman
- 907 WHSE—32-1-4T Goodman
- 30-B Goodman—825 General Electric
- Complete Cleaning Plant—Roberts & Schaefer
- 48" Single Tandem Pre-Engineered HYDRO-SEPARATOR—1—TPM 3 by ½" Coal—Excellent Condition—Complete
- Link-Belt Triple Equipment—Main Shaker—Feeder—Elevator Loading Booms—Conveyors—Car Retarder—Assorted Screens
- 1—Open Top 4000 Gal Steel Tank
- AC and DC Motors—Air Cooled Gas Engine
- Locomotive tires
- 2—Shop-Made Shakers ¾" Round Hole Screens—220 AC 3 Phase Drives
- First Aid Supplies—Safety Lamps
- End Dump Cars—23" Above Rail
- 2—Jeffrey 35-L Machines
- 1—35-B 1—35BB with Trucks
- 1—Buddy Sullivan 5-B1 with Truck
- 1—Goodman 312 Machine
- 1—Jeffrey 24-B
- 1—Sullivan CB-10 16" High
- 1—Sullivan CB-6 with Truck
- 1—Goodman 412
- 1—Goodman 212-AA, 220 AC
- 1—2 by 6 Aero-Vibe Screen
- 1—5 by 14 Hewitt-Robins Screen
- 1—5 by 14 Ripple Flow
- Substations 100 KW to 300 KW
- Pumps—Blowers—Fans—Jacks
- Machine trucks and Pony trucks
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- 723 Page Walking Drag, 130', 10 yd.
- 621-3 Page Walking Drag, 135', 6 yd.
- 2400 Lima Dragline, 130', 5 yd.
- 5-W Bucyrus Monaghan Drag, 120', 5 yd.
- 4500 Manitowoc Drag, 120', 5 yd.
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- 1055 P&H Drag, 100', 3½ yd.
- 170-B Bucyrus Erie 6½ yd. Elec. Shovel
- 150-B Bucyrus Erie 6 yd. Elec. Shovel
- 4500 Manitowoc 5 yd. H. L. Shovel
- 120-B Bucyrus Erie 4 yd. Elec. Shovel
- 1055 P&H 3½ yd. Standard Shovel
- 1201 Lima 2½ yd. H. L. Shovel
- 3500 Manitowoc 2 yd. H. L. Shovel
- Also, various smaller Shovels & Drags
- 400 Reich Truck Mounted Rotary Air Drill
- 600 Reich Heavy Truck Mounted Rotary Air Drills
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- 10—20 YD. AIR DUMP CARS

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CONVEYORS

- 1200—40" Belt conveyor, complete w/ Supporting structure accessories. (Cinap)
- 2000—36" Joy Limboller Belt Conv., complete w/ belting—Unit almost new—part of structure never used
- 1000—36" Joy Belt Drive with belt
- 8—36" Joy Belt drives with or without motors
- 2600—36" Barber Green Belt conv., complete with belt & drive, extra heavy duty—excellent
- 7000—30" Jeffrey 32B Structure with or without belt
- 3000—30" Joy MTB Structure with or without belt
- 3340—30" Barber Green structure with or without belt
- 900—26" Joy Belt Conv., with or without belts.
- 1000—26" Jeffrey 32B Belt Conv., complete.
- 40—36" Belt Drives of Various Types
- 500—24" Goodman Belt Conv., complete
- 13—20" Joy Chain Conv. Permissible
- 2—15" Joy Chain Conv. Permissible.
- 18—15" & 12" 61EW, 61MG, 61W, & 61AM Jeffrey chain conv.
- 52—G12½, G13, G20 Goodman Shakers, AC & DC
- 2—PT12 Long Piggyback Conv.
- 31—Goodman power duckbills Model 477

TRACKLESS EQUIPMENT

- 1—T2—5 Joy Cat Tractor
- 1—Lee Nurse Continuous Miner
- 1—48U 7RBE Joy Loaders
- 1—48U 7CE Joy Loader
- 2—48U 3PE Joy Loaders
- 1—48U 9E & 7E Joy Loader, rebuilt, & recond.
- 2—8BU 300 Volt DC
- 2—8BU 250 Volt DC—Rebuilt
- 2—Myers Whalley, C.S. Loaders
- 2—6SC Joy Shuttle Cars
- 3—32D Joy Shuttle Cars
- 3—32E7 Joy Shuttle Cars
- 4—32E10 Joy cars—rebuilt
- 1—32E16 Joy Shuttle Car
- 3—42E13 Joy Shuttle Cars
- 1—PL11—7PE Joy Elevator
- 1—PL11—8PE Joy Elevator
- 2—40 H.P., Acme, self-propelled air compressors
- 1—Permissible
- 2—30 H.P., Acme Track Mtd. Air Comp. 30" High
- 3—Joy T12 Battery Supply Jeeps, complete with batteries & chargers
- 1—R6D Chicago Pneumatic Roof Bolting machine
- 3—MSA Bantam Rock Dusters on tires
- 1—360 Goodman Loader

SUBSTATIONS & TRANSFORMERS

- 2—40KW Rotary Converters
- 1—75KW Buda Diesel w/ 250 V., Generator
- 1—100KVA Gasoline Generator Unit
- 1—100KW Buda Diesel w/ 250 V., Generator
- 1—100KW UD24 International Diesel w/ 250 V. DC Generator
- 1—150KW, Rotary Converter—Completely automatic

- 19—150KW, MG sets of various makes & primary voltage
- 4—200KW MG Sets
- 2—300KW G. E. Sets, (MG) 2300/4000 275 V.
- 2—300KW, G. E., MG Sets 2300/4000V., with boards
- 2—300KW, G. E., MG sets 2300/4000 275 V.
- 2—Armatures for 150 & 200 KW Rotary
- 2—600 & 800 KVA Automatic transformers
- 100—Transformers of various sizes

CUTTING MACHINES

- 4—2AU Track Mtd Sullivans
- 3—7B Sullivans
- 12—11B Sullivans 35 & 50 H.P.
- 8—12AB & 12AA Standard Goodmans
- 3—112AA Universal Goodmans
- 21—212AA Baby Goodmans, 250V
- 1—212G3 Baby Goodman, 220 440V.
- 9—512 Goodmans 2 w/ Bugdusters
- 2—712 Goodmans
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- 1—29U Jeffrey 220 440 V. 42" Track Gauge Excellent
- 1—20UR Jeffrey, Rubber-Mtd.
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- 35—6 Ton Locomotives
- 1—6 Ton Battery Locomotives New
- 1—7 Ton Jeffrey
- 20—8 Ton Locomotives 250 Volt, any gauge
- 7—10 Ton Locomotives 250 V., any gauge
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MINE CARS

- 39—36" T.G. Drop Bottoms
- 233—42" T.G. End Dumps, Various makes & sizes
- 33—44" T.G. Drop Bottoms 10 ton
- 174—44" T.G. Drop Bottoms, Various Sizes
- 503—44" T.G. End Dumps, Various Makes & Sizes
- 60—48" T.G. S.D., Drop Bottoms

TIPPLE EQUIPMENT

- 2—Complete tipples, including cleaning plant, conveyors, crushers, bin, etc.
- 3—American Air tables for stoker & carbon
- 1—4 Cell Jeffrey Baum jig washer—may be seen operating
- 1—CMI Coal Dryer 48" Excellent Condition
- 2—Heat Dryers complete
- 1—Marion Double Roll Primary Crusher
- 1—24" x 50" Penn. Single Roll Crusher
- 1—36" x 36" D.R. crusher (double roll)
- 1—24" x 30" Double Roll crusher
- 1—24" x 24" Single Roll crusher
- 1—24" x 20" Jeffrey Flextooth crusher

- 1—18" x 12" Jeffrey swing hammer pulverizer
- 1—3' x 14" Allis-Chalmers Double Deck Vibrator
- 2—6' x 12 Allis-Chalmers Double Deck Vibrators
- 1—3' x 8' Allis-Chalmers low head vibrator
- 9—Jeffrey Traylor vibrator feeders
- 5—Jeffrey Traylor vibrator screens
- 1—Magnetic Separator—Complete
- 1—Set Jeffrey Dewatering screens
- 1—Hi-Pressure Oil Spray & 5 Oil Tanks
- 14—Scraper conveyors of various sizes
- 32—Tipple Belts 15" to 42" width & various lengths
- 5—Loading booms with hoists
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- 3390 Tons—20, 30, 36, 70, and 85 lb. Relaying Rail
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- 7500—750,000CM Insulated Copper feeder wire
- 13,550—300,000CM insulated copper feeder wire
- 17,000—350,000CM Rubber covered & insulated copper
- 80,000—4 0 Rubber covered & insulated copper
- 12,000—0 0 Trolley Wire
- 5000—4 0 Trolley Wire
- 56,000—2 0 Solid Copper Transmission Line
- 205,000—2 Solid Copper Transmission Line
- 30—Spools New Telephone Wire

MISCELLANEOUS

- 1—800 H.P., Single Drum Hoist
- 1—300H.P., Single Drum Hoist
- 1—100 H.P., Single Drum Hoist
- 97—Hoists from 3 H.P., to 800 H.P.
- 1—800 H.P., Motor
- 1—500 H.P., Motor
- 2—300 H.P., Motors
- 564—Stationary Motors ½ H.P., to 300 H.P., of various specifications
- 1—1200GPM Cent. Pump
- 1—1000GPM Cent. Pump
- 2—800 GPM Cent. Pumps
- 1—600 GPM Cent. Pump
- 83—Pumps from ½" to 1200GPM Various Specs.
- 23—Mine Fans from 30" to 6' Hi-Pressure
- 233—Coal Drills 571 C.P., 572 C.P. A6 & A7 Jeffrey
- 13—Scales for mine tracks & trucks
- 22—Air compressors of various sizes
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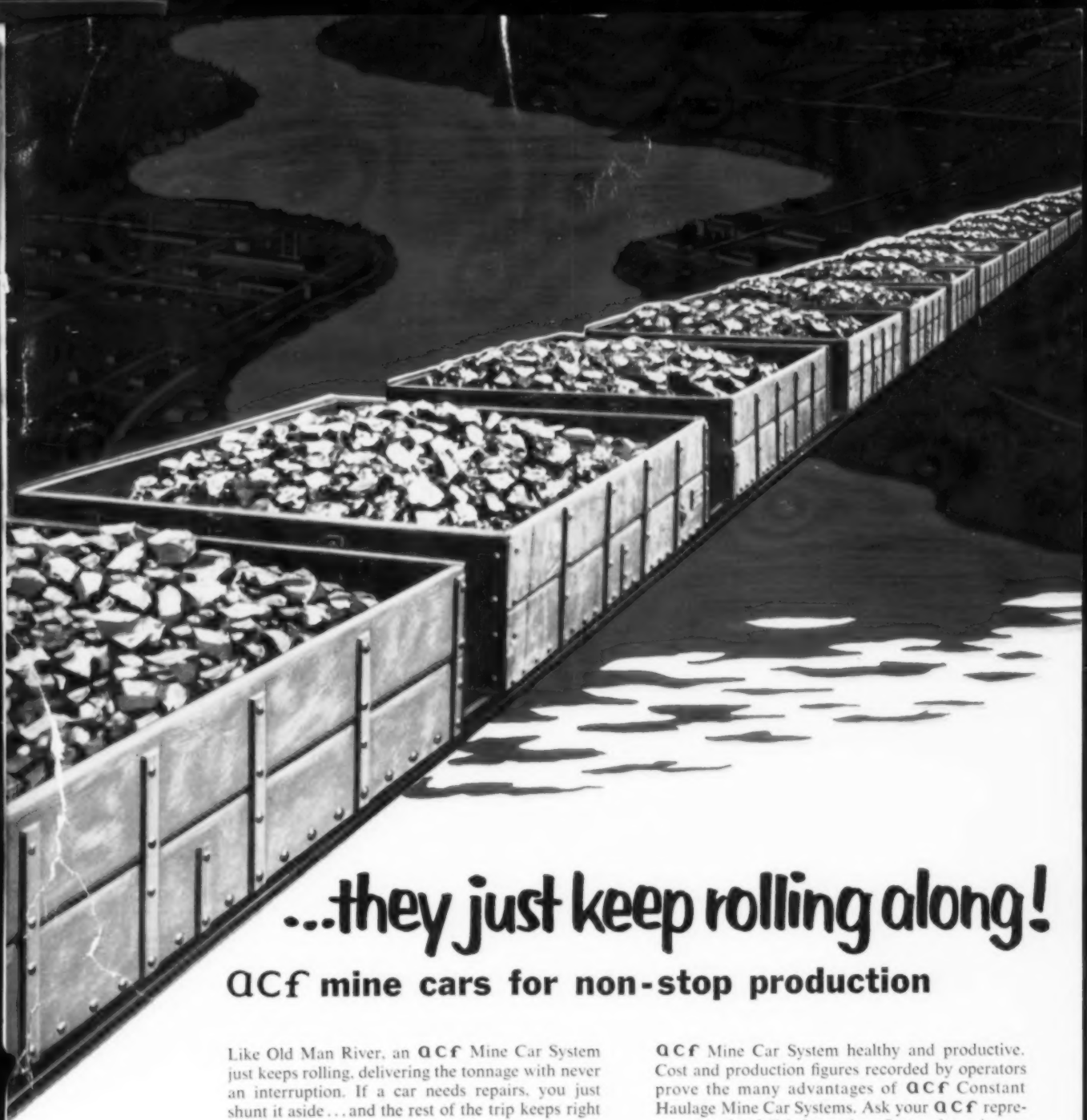
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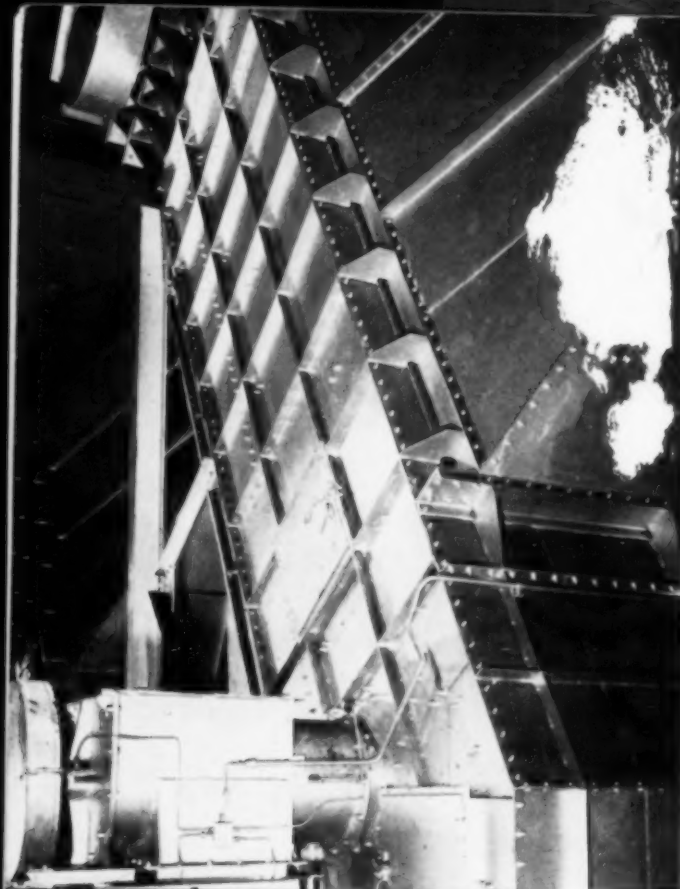
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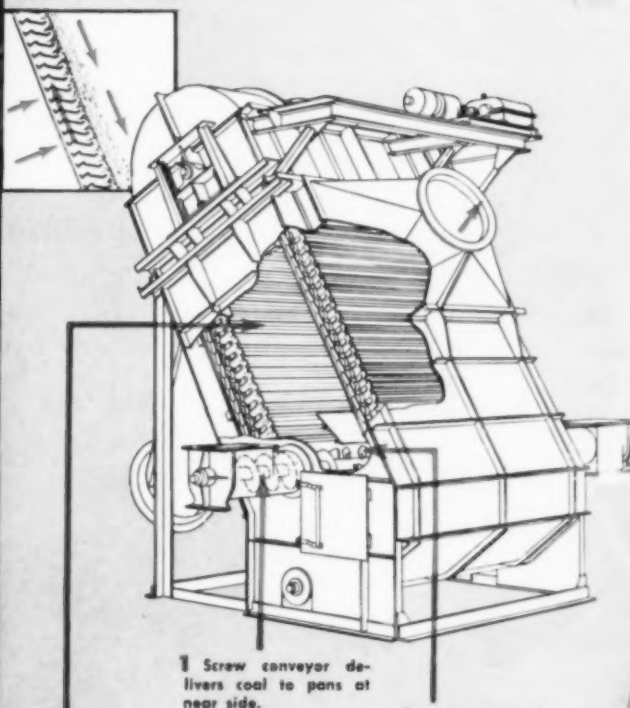
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for Constant Haulage



HERE'S HOW THE MULTI-LOUVRE WORKS—Louvre pans raise the coal and spill it out to form a constantly moving curtain, through which heated air is drawn by exhaust fans. A screw-paddle conveyor gently moves the coal to an-



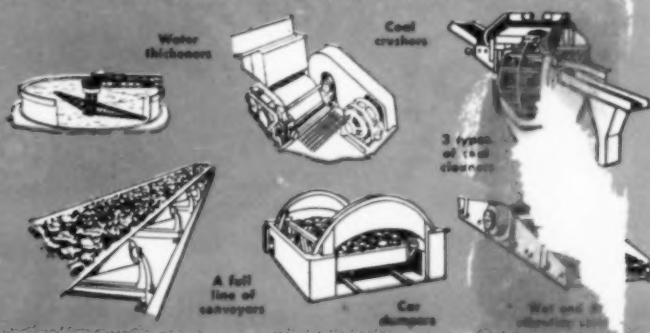
2 Material discharged from pans falls back to loading zone, clearing ascending material.

3 When material, after several passes through the air stream, has traveled to the far side, it is discharged by the screw conveyor extension.

other section of the moving apron to be carried up and spilled out again. Constant agitation of shallow material bed assures thorough circulation of air and reduces power requirements to a minimum.

Why you produce more marketable coal with LINK-BELT Multi-Louvre dryers

Part of Link-Belt's broad line of quality equipment



LINK-BELT

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